Internal Use Only

Service Manual

LG-T500

Date: March, 2011 / Issue 1.0

Table Of Contents

1. INTRODUCTION

1.1 Purpose

This manual provides the information necessary to repair, calibration, description and download the features of this model.

1.2 Regulatory Information

A. Security

Toll fraud, the unauthorized use of telecommunications system by an unauthorized part (for example, persons other than your company's employees, agents, subcontractors, or person working on your company's behalf) can result in substantial additional charges for your telecommunications services. System users are responsible for the security of own system. There are may be risks of toll fraud associated with your telecommunications system. System users are responsible for programming and configuring the equipment to prevent unauthorized use. The manufacturer does not warrant that this product is immune from the above case but will prevent unauthorized use of common-carrier telecommunication service of facilities accessed through or connected to it.
The manufacturer will not be responsible for any charges that result from such unauthorized use.

B. Incidence of Harm

If a telephone company determines that the equipment provided to customer is faulty and possibly causing harm or interruption in service to the telephone network, it should disconnect telephone service until repair can be done. A telephone company may temporarily disconnect service as long as repair is not done.

C. Changes in Service

A local telephone company may make changes in its communications facilities or procedure. If these changes could reasonably be expected to affect the use of the this phone or compatibility with the network, the telephone company is required to give advanced written notice to the user, allowing the user to take appropriate steps to maintain telephone service.

D. Maintenance Limitations

Maintenance limitations on this model must be performed only by the manufacturer or its authorized agent. The user may not make any changes and/or repairs expect as specifically noted in this manual. Therefore, note that unauthorized alternations or repair may affect the regulatory status of the system and may void any remaining warranty.

E. Notice of Radiated Emissions

This model complies with rules regarding radiation and radio frequency emission as defined by local regulatory agencies. In accordance with these agencies, you may be required to provide information such as the following to the end user.

F. Pictures

The pictures in this manual are for illustrative purposes only; your actual hardware may look slightly different.

G. Interference and Attenuation

Phone may interfere with sensitive laboratory equipment, medical equipment, etc.Interference from unsuppressed engines or electric motors may cause problems.

H. Electrostatic Sensitive Devices

ATTENTION

Boards, which contain Electrostatic Sensitive Device (ESD), are indicated  **by the sign. Following information is ESD handling:**

- Service personnel should ground themselves by using a wrist strap when exchange system boards.
- When repairs are made to a system board, they should spread the floor with anti-static mat which is also grounded.
- Use a suitable, grounded soldering iron.
- Keep sensitive parts in these protective packages until these are used.
- When returning system boards or parts like EEPROM to the factory, use the protective package as described.

1.3 Abbreviations

For the purposes of this manual, following abbreviations apply:

APC	Automatic Power Control
BB	Baseband
BER	Bit Error Ratio
CC-CV	Constant Current – Constant Voltage
DAC	Digital to Analog Converter
DCS	Digital Communication System
dBm	dB relative to 1 milli watt
DSP	Digital Signal Processing
EEPROM	Electrical Erasable Programmable Read-Only Memory
ESD	Electrostatic Discharge
FPCB	Flexible Printed Circuit Board
GMSK	Gaussian Minimum Shift Keying
GPIB	General Purpose Interface Bus
GSM	Global System for Mobile Communications
IPUI	International Portable User Identity
IF	Intermediate Frequency
LCD	Liquid Crystal Display
LDO	Low Drop Output
LED	Light Emitting Diode
OPLL	Offset Phase Locked Loop

PAM	Power Amplifier Module
PCB	Printed Circuit Board
PGA	Programmable Gain Amplifier
PLL	Phase Locked Loop
PSTN	Public Switched Telephone Network
RF	Radio Frequency
RLR	Receiving Loudness Rating
RMS	Root Mean Square
RTC	Real Time Clock
SAW	Surface Acoustic Wave
SIM	Subscriber Identity Module
SLR	Sending Loudness Rating
SRAM	Static Random Access Memory
PSRAM	Pseudo SRAM
STMR	Side Tone Masking Rating
TA	Travel Adapter
TDD	Time Division Duplex
TDMA	Time Division Multiple Access
UART	Universal Asynchronous Receiver/Transmitter
VCO	Voltage Controlled Oscillator
VCTCXO	Voltage Control Temperature Compensated Crystal Oscillator
WAP	Wireless Application Protocol

2. PERFORMANCE

2.1 H/W Features

Item	Feature	Comment
Standard Battery	Lithium-Ion, 3.7V 950mAh	
Stand by TIME	Up to 500 hrs : Paging Period 5, RSSI 85dBm	
Talk time	Up to 5hrs : GSM Tx Level 7	
Charging time	Approx 3.5hours	
RX Sensitivity	GSM, EGSM: -109dBm, DCS: -109dBm	
TX output power	GSM, EGSM: 32.8dBm(Level 5), DCS , PCS: 29.8dBm(Level 0)	
GPRS compatibility	Class 12	
SIM card type	3V / 1.8V	
Display	MAIN : 2.8" TFT 240 × 320 pixel 262K Color	
Status Indicator	Send Key, End Key, Cancel Key, Volume Up/Down Key, PWR(Lock) Key	
ANT	Internal	
EAR Phone Jack	Yes (3.5Φ)	
PC Synchronization	Yes	
Speech coding	EFR/FR/HR	
Data and Fax	Yes	
Vibrator	Yes	
Loud Speaker	Yes	
Voice Recoding	Yes	
Microphone	Yes	

Item	Feature	Comment
Speaker/Receiver	18x12Φ Speaker/ 1107 Receiver	
Travel Adapter	Yes	
MIDI	SW MIDI (Mono SPK)	
Camera	2.0M FF	
Bluetooth / FM Radio	Bluetooth version 2.1 / Wired FM radio (Earphone needed)	

2.2 Technical Specification

<table>
<tr><th>Item</th><th>Description</th><th>Specification</th></tr>
<tr><td>1</td><td>Frequency Band</td><td>GSM850
TX: 824 ~ 849 MHz
RX: 869 ~ 894 MHz
EGSM
TX: 880 ~ 915MHz
RX: 925 ~ 960 MHz
DCS
TX: 1710 ~ 1785 MHz
RX: 1805 ~ 1880 MHz
PCS
TX: 1850 ~ 1910 MHz
RX: 1930 ~ 1990 MHz</td></tr>
<tr><td>2</td><td>Phase Error</td><td>RMS < 5 degrees
Peak < 20 degrees</td></tr>
<tr><td>3</td><td>Frequency Error</td><td>< 0.1 ppm</td></tr>
<tr><td>4</td><td>Power Level</td><td>
GSM850/EGSM
<table>
<tr><th>Level</th><th>Power</th><th>Toler.</th><th>Level</th><th>Power</th><th>Toler.</th></tr>
<tr><td>5</td><td>33dBm</td><td>±2dB</td><td>13</td><td>17dBm</td><td>± 3dB</td></tr>
<tr><td>6</td><td>31dBm</td><td>±3dB</td><td>14</td><td>15dBm</td><td>± 3dB</td></tr>
<tr><td>7</td><td>29dBm</td><td>±3dB</td><td>15</td><td>13dBm</td><td>± 3dB</td></tr>
<tr><td>8</td><td>27dBm</td><td>±3dB</td><td>16</td><td>11dBm</td><td>± 5dB</td></tr>
<tr><td>9</td><td>25dBm</td><td>±3dB</td><td>17</td><td>9dBm</td><td>± 5dB</td></tr>
<tr><td>10</td><td>23dBm</td><td>±3dB</td><td>18</td><td>7dBm</td><td>± 5dB</td></tr>
<tr><td>11</td><td>21dBm</td><td>±3dB</td><td>19</td><td>5dBm</td><td>± 5dB</td></tr>
<tr><td>12</td><td>19dBm</td><td>±3dB</td><td></td><td></td><td></td></tr>
</table>
DCS/PCS
<table>
<tr><th>Level</th><th>Power</th><th>Toler.</th><th>Level</th><th>Power</th><th>Toler.</th></tr>
<tr><td>0</td><td>30dBm</td><td>±2dB</td><td>8</td><td>14dBm</td><td>± 3dB</td></tr>
<tr><td>1</td><td>28dBm</td><td>±3dB</td><td>9</td><td>12dBm</td><td>± 4dB</td></tr>
<tr><td>2</td><td>26dBm</td><td>±3dB</td><td>10</td><td>10dBm</td><td>± 4dB</td></tr>
<tr><td>3</td><td>24dBm</td><td>±3dB</td><td>11</td><td>8dBm</td><td>± 4dB</td></tr>
<tr><td>4</td><td>22dBm</td><td>±3dB</td><td>12</td><td>6dBm</td><td>± 4dB</td></tr>
<tr><td>5</td><td>20dBm</td><td>±3dB</td><td>13</td><td>4dBm</td><td>± 4dB</td></tr>
<tr><td>6</td><td>18dBm</td><td>±3dB</td><td>14</td><td>2dBm</td><td>± 5dB</td></tr>
<tr><td>7</td><td>16dBm</td><td>±3dB</td><td>15</td><td>0dBm</td><td>± 5dB</td></tr>
</table>
</td></tr>
</table>

Item	Description	Specification	
5	Output RF Spectrum (due to modulation)	**GSM850/ EGSM**	
		Offset from Carrier (kHz).	Max. dBc
		100	+0.5
		200	-30
		250	-33
		400	-60
		600~ <1,200	-60
		1,200~ <1,800	-60
		1,800~ <3,000	-63
		3,000~ <6,000	-65
		6,000	-71
		DCS/PCS	
		Offset from Carrier (kHz).	Max. dBc
		100	+0.5
		200	-30
		250	-33
		400	-60
		600~ <1,200	-60
		1,200~ <1,800	-60
		1,800~ <3,000	-65
		3,000~ <6,000	-65
		6,000	-73
6	Output RF Spectrum (due to switching transient)	**GSM850/ EGSM**	
		Offset from Carrier (kHz).	Max. dBm
		400	-19
		600	-21
		1,200	-21
		1,800	-24

<table>
<tr><th>Item</th><th>Description</th><th colspan="3">Specification</th></tr>
<tr><td rowspan="6">6</td><td rowspan="6">Output RF Spectrum
(due to switching
transient)</td><td colspan="3">DCS/PCS</td></tr>
<tr><td colspan="2">Offset from Carrier (kHz).</td><td>Max. dBm</td></tr>
<tr><td colspan="2">400</td><td>-22</td></tr>
<tr><td colspan="2">600</td><td>-24</td></tr>
<tr><td colspan="2">1,200</td><td>-24</td></tr>
<tr><td colspan="2">1,800</td><td>-27</td></tr>
<tr><td>7</td><td>Spurious Emissions</td><td colspan="3">Conduction, Emission Status</td></tr>
<tr><td>8</td><td>Bit Error Ratio</td><td colspan="3">GSM850, EGSM
BER (Class II) < 2.439% @-102 dBm
DCS,PCS
BER (Class II) < 2.439% @-100 dBm</td></tr>
<tr><td>9</td><td>RX Level Report Accuracy</td><td colspan="3">±3 dB</td></tr>
<tr><td>10</td><td>SLR</td><td colspan="3">12±3 dB</td></tr>
<tr><td rowspan="10">11</td><td rowspan="10">Sending Response</td><td>Frequency (Hz)</td><td>Max.(dB)</td><td>Min.(dB)</td></tr>
<tr><td>100</td><td>-12</td><td>-</td></tr>
<tr><td>200</td><td>0</td><td>-</td></tr>
<tr><td>300</td><td>0</td><td>-12</td></tr>
<tr><td>1,000</td><td>0</td><td>-6</td></tr>
<tr><td>2,000</td><td>4</td><td>-6</td></tr>
<tr><td>3,000</td><td>4</td><td>-6</td></tr>
<tr><td>3,400</td><td>4</td><td>-9</td></tr>
<tr><td>4,000</td><td>0</td><td>-</td></tr>
<tr><td>12</td><td>RLR</td><td colspan="3">4±3 dB</td></tr>
</table>

<table>
<tr><th>Item</th><th>Description</th><th colspan="3">Specification</th></tr>
<tr><td rowspan="11">13</td><td rowspan="11">Receiving Response</td><td>Frequency (Hz)</td><td>Max.(dB)</td><td>Min.(dB)</td></tr>
<tr><td>100</td><td>-12</td><td>-</td></tr>
<tr><td>200</td><td>0</td><td>-</td></tr>
<tr><td>300</td><td>2</td><td>-7</td></tr>
<tr><td>500</td><td>*</td><td>-5</td></tr>
<tr><td>1,000</td><td>0</td><td>-5</td></tr>
<tr><td>3,000</td><td>2</td><td>-5</td></tr>
<tr><td>3,400</td><td>2</td><td>-10</td></tr>
<tr><td>4,000</td><td>2</td><td></td></tr>
<tr><td colspan="3">* Mean that Adopt a straight line in between 300 Hz and 1,000 Hz to be Max. level in the range.</td></tr>
<tr><td>14</td><td>STMR</td><td colspan="3">> 17 dB</td></tr>
<tr><td>15</td><td>Stability Margin</td><td colspan="3">> 6 dB</td></tr>
<tr><td rowspan="9">16</td><td rowspan="9">Distortion</td><td colspan="2">dB to ARL (dB)</td><td>Level Ratio (dB)</td></tr>
<tr><td colspan="2">-35</td><td>17.5</td></tr>
<tr><td colspan="2">-30</td><td>22.5</td></tr>
<tr><td colspan="2">-20</td><td>30.7</td></tr>
<tr><td colspan="2">-10</td><td>33.3</td></tr>
<tr><td colspan="2">0</td><td>33.7</td></tr>
<tr><td colspan="2">7</td><td>31.7</td></tr>
<tr><td colspan="2">10</td><td>25.5</td></tr>
<tr><td>17</td><td>Side Tone Distortion</td><td colspan="3">Three stage distortion < 10%</td></tr>
<tr><td>18</td><td>System frequency (13 MHz) tolerance</td><td colspan="3">≤ 2.5 ppm</td></tr>
<tr><td>19</td><td>32.768KHz tolerance</td><td colspan="3">≤ 30 ppm</td></tr>
<tr><td>20</td><td>Ringer Volume</td><td colspan="3">At least 55 dBspl under below conditions:
1. Ringer set as ringer.
2. Test distance set as 1 m</td></tr>
</table>

<table>
<tr><th>Item</th><th>Description</th><th colspan="3">Specification</th></tr>
<tr><td>21</td><td>Charge Current</td><td colspan="3">Fast Charge : Typ. 400 mA
Slow Charge : Typ. 95mA
Total Charging Time : < 3.5 hours</td></tr>
<tr><td rowspan="8">22</td><td rowspan="8">Antenna Display</td><td>Bar Number</td><td colspan="2">Power</td></tr>
<tr><td>7</td><td colspan="2">Over -92</td></tr>
<tr><td>7 -> 5</td><td colspan="2">-93 ± 2</td></tr>
<tr><td>5 -> 4</td><td colspan="2">-98 ± 2</td></tr>
<tr><td>4 -> 2</td><td colspan="2">-101 ± 2</td></tr>
<tr><td>2 -> 1</td><td colspan="2">-104 ± 2</td></tr>
<tr><td>1 -> 0</td><td colspan="2">-106 ± 2</td></tr>
<tr><td>0 -> OFF</td><td colspan="2">Under -106</td></tr>
<tr><td rowspan="5">23</td><td rowspan="5">Battery Indicator</td><td colspan="2">Battery Bar Status</td><td>Percent (%)</td></tr>
<tr><td colspan="2">Full (16 level)</td><td>≥ 94%</td></tr>
<tr><td colspan="2">Decrease gradually</td><td>94~10%</td></tr>
<tr><td colspan="2">Battery icon color : Green → Red</td><td>≤10%</td></tr>
<tr><td colspan="2">Empty(0 level)</td><td>≤ 2%</td></tr>
<tr><td rowspan="2">24</td><td rowspan="2">Low Voltage Warning
(Blinking Bar)</td><td colspan="3">10%, 5% 2times (standby) – Speaker</td></tr>
<tr><td colspan="3">≤ 10% at every 1min. (call) - Receiver</td></tr>
<tr><td>25</td><td>Forced shut down
Voltage</td><td colspan="3">0% (about 3.35V)</td></tr>
<tr><td>26</td><td>Sustain RTC
without battery</td><td colspan="3">Over 2 hours</td></tr>
<tr><td>27</td><td>Battery Type</td><td colspan="3">Lithium-Ion Battery
Standard Voltage = 3.7 V
Battery full charge voltage = 4.2 V
Capacity: 950mAh</td></tr>
<tr><td>28</td><td>Travel Charger</td><td colspan="3">Switching-mode charger
Input: 100 ~ 240V, 50/60 Hz
Output: 4.8V, 400mA</td></tr>
</table>

3. TECHNICAL BRIEF

3.1 Digital Main Processor

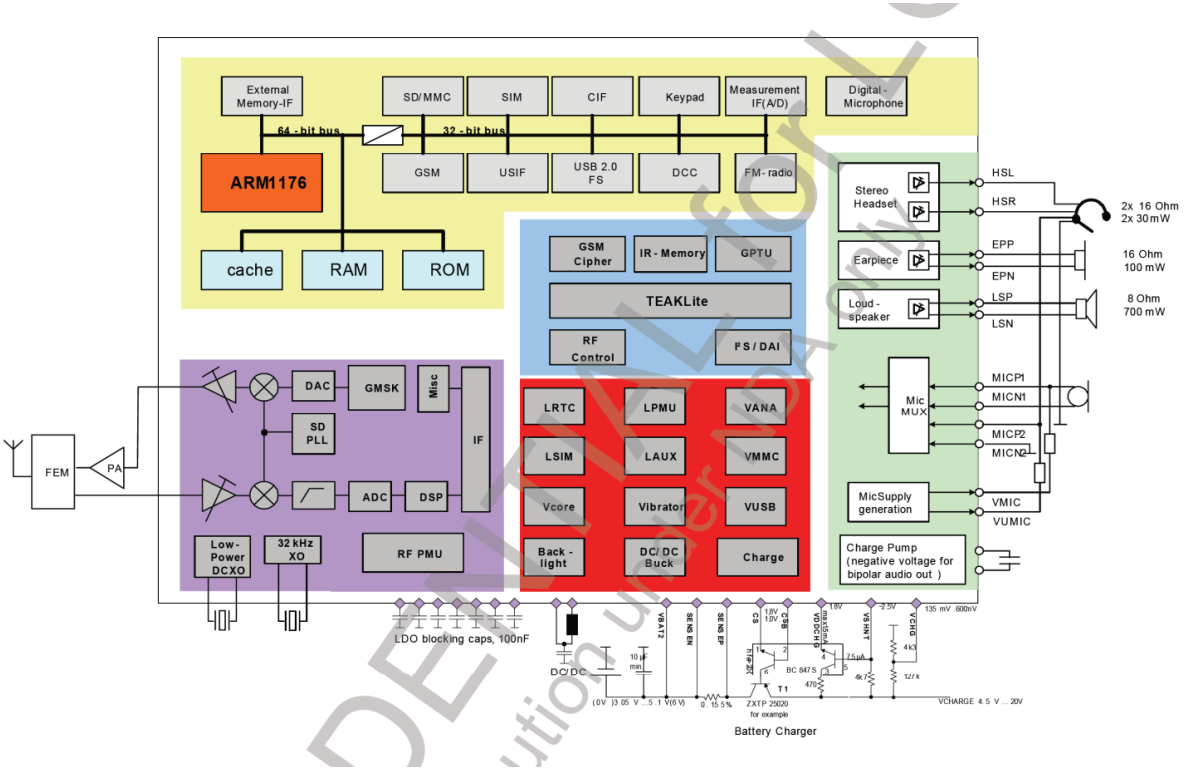


Figure. 3.1.1 X-Gold tm 215 Hardware Block Diagram

3.1.1 General

• Technology:
– SoC, Monolithic, 65 nm CMOS
• Package:
– eWLB, 8x9 x0.8 mm
– 0.5 mm pitch
– 240 balls / 6-layer PCB

3.1.2 RF Transceiver

• Dual-band direct conversion receiver
• Tri/Quad-band possible with external circuitry
• Fully integrated digital controlled X0
• Additional buffer for 2 external system clocks
• Fully digital RF-Synthesizer incl. ΣΔ-Transmitter

3.1.3 Baseband

• DSP:
– 156 MHz TeakLite™
• MCU:
– ARM1176® @ 208 MHz
• MCU RAM:
– 3.00Mbit
• Memory I/F:
– 1 Gbit NOR flash/OneNAND flash/SDR SDRAM
– 4 Gbit NAND flash/DDR SDRAM
• Modem:
– GPRS class 12, (RX/TX CS1-CS4)
– EGPRS class 12, (RX MCS1-MCS9, TX MCS1-MCS4)
• Cipher Units:
– A51/2/3
– GEA-1/2/3
• Security:
– OMTP TR0
– Secure Boot
– RSA(ROM)/SHA-1(HW accel.)
– OCDS disabling
– Certificate Management
• Speech Codec:
– FR / HR / EFR / NB-AMR
• Audio Codec (running on ARM1176):
– SP-MIDI
– SB-ADPCM
– MP3
– WB-AMR
– AAC/AAC+/eAAC+
• Others:
– DARP (SAIC)
– TTY
• Customization:
– E-Fuses

3.1.4 External Memory

• External Bus Unit
– 16-bit address bus
– 16-bit address/data muxed bus
– 1.8V support
• Flash / RAM
– NOR Type
– NAND Type (1 bit ECC supported)
– Parallel Flash / Cellular RAM(Page & Burst Mode)
  - 16-bit AD-multiplexed
  - 16-bit AAD-multiplexed
– iNAND Type e.g. oneNAND
– SDRAM
  - DDR SDRAM : up to 4 Gbit
  - SDR SDRAM : up to 1 Gbit
• Memory card
– SD/MMC card interface with 1 or 4 data lines

3.1.5 Connectivity

• 3xUSIF (configurable either as SPI or UART), I2C, I2S; Interfaces @ 1.8V
• Direct (U)SIM 1.8/3V
• USB2.0 up to 480 Mbit/s (High Speed) w/ external USB Phy over ULPI interface
• Stereo Headset (Amplifier integrated)
• 3 external analog measurement PIN's
• Bluetooth

3.1.6 Mixed Signal

• Improved audio performance
• Loudspeaker Audio Class D Amplifier, 700 mW@8 Ω mon for hands-free and ringing
• Stereo Headset 2x30 mW@16 Ω w/o coupling C
• Mono Earpiece 100 mW@16 Ω
• Digital microphone supported
• Differential microphone inputs

3.1.7 FM Radio

• Integrated FM radio
– FM Stereo RDS Receiver
– Sensitivity 2 μV EMF
– Support for US & EU bands
– Stereo recording

3.1.8 Power Management

• Direct-to-Battery Connection
– LDOs (incl. capless)
– DC/DC step-down converter
– DC/DC step-up for white LED supply
• Battery Type
– Li-Polymer
• Charging control
– Battery temperature
– Watchdog protection
– Start-up on flat battery
• External Charger
– Switch mode
• USB battery charging
– USB charging spec 1.0 compliant
• Backlight
– Up to 4 serial white LEDs (integrated LDO)

3.1.9 Main LCD Display

• Type
– 240*320, QVGA, 262k color (parallel)
• Interface
– Parallel 8/9bit MIPI-DBI Type B
– Serial MIPI-DBI Type C
– Interf. voltage at 1.8V or 2.8V
• gRacr - Display Controller (Hardware)
– 30 fps Display update without DMA (up to 60 fps) (full or partial)
– Video post processing Scaling, Rotation (90˚ steps), Mirroring
– Overlay with alpha blending
– Color conversion YUV -> RGB
– 2D vector graphics (Lines, filled rectangles, Bit block transfer (e.g. sprites, scrolling, antialiased bitmap fonts)

3.1.10 Camera

• 2 Mpx YUV parallel interface
• HW JPEG encoder (39 Mpx/sec)
• 39 MHz Pixel Rate
• 15 fps@ 2 Mpx full resolution

3.1.11 Video Capabilities

• Video Decoding MPEG-4/H.263
– QCIF@30 fps
– QVGA@15fps
• Video Encoding MPEG-4/H.263
– QCIF@15 fps

3.1.12 Audio Capabilities

• Polyphonic ring tones
– 64 voices MIDI, SP-MIDI
– FM synthesizer
• AMR-WB
• True ring tones (MP3)
• MP3, eAAC+
• G.722 SB-ADPCM encoding/decoding

3.2 Power Management

A mobile platform requires power supplies for different functions. These power supplies are generated in the integrated power management Unit (PMU). The PMU is designed to deliver the power for a typical standard phone.

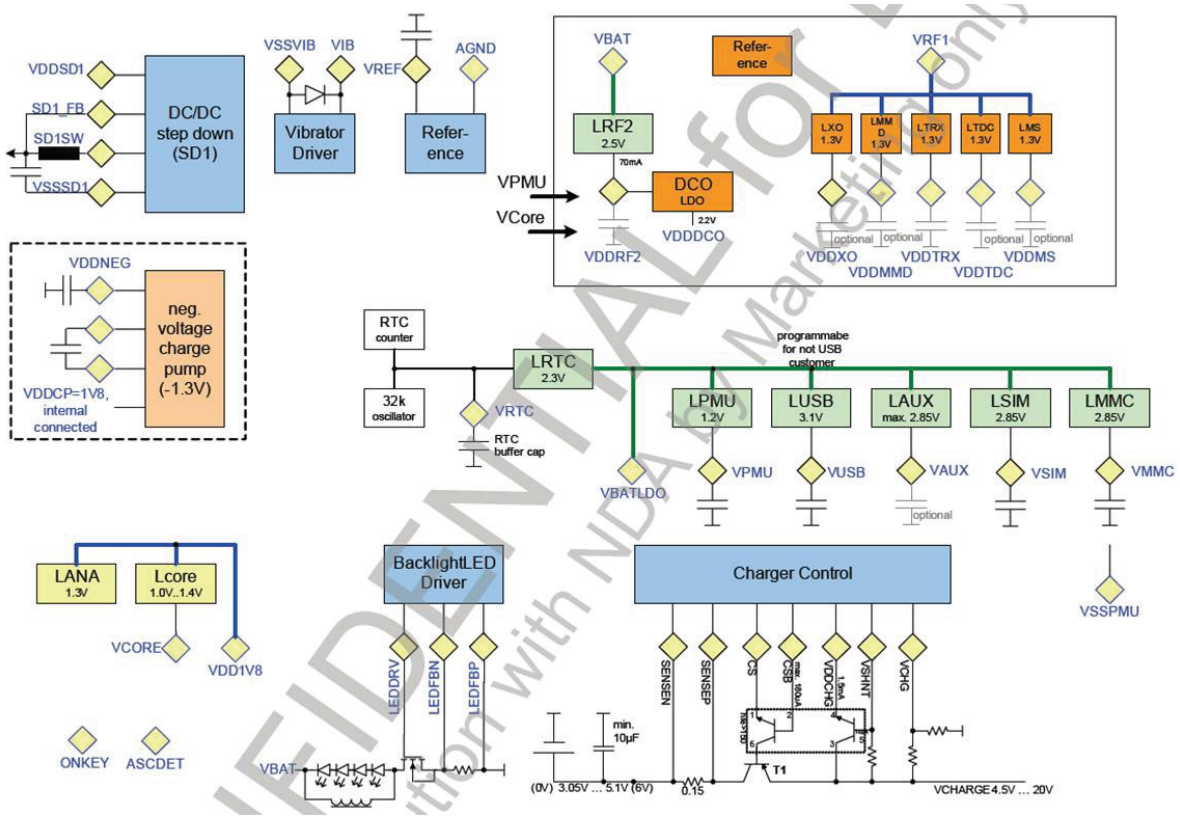


Figure. 3-2-1 Block Figure of the PMU Modules X-Gold tm 215

▪ **DC/DC Step Down Converter for 1.8V (SD1)**

The DC/DC converter generates a 1.8V supply rail. This voltage rail is used to supply main parts of the system, like the digital core of the chip (via LDO LCORE), some parts of the mixed signal macro, parts of the RF macro and the external memory if a 1.8V memory is used. The efficiency of the DC/DC converter is optimized for an average load current of 100mA. That is the load current estimated for the GSM talk mode.

▪ Linear voltage Regulators (low dropout) LDOs

The LDOs are used to generate the supply for the different supply domains not directly supplied out of the DC/DC converter.

The VSIM output current is high enough to drive USB SIM cards.

▪ LCORE

The LCORE LDO provides the VCORE supply used for most of the digital parts of the chip

▪ LPMU

The LPMU provides VPMU sued for the PMU supply, e.g. for the startup state machine and analog parts like ADC, sense amplifier etc.

▪ LUSB

The LUSB LDO generates the supply for the USB transceiver (output driver and input). If no USB interface is required, LUSB can be used as general purpose LDO.

▪ LAUX

The LAUX generates VAUX. It is a general purpose LDO and can be used for different functions depending on the phone application, e.g. for the display or Camera.

▪ LMMC

The LMMC generates VMMC. It is a general purpose LDO and can be used e,g. for memory cards

▪ LSIM

The LSIM LDO generates the VSIM supply for the SIM card and interface. It is designed to supply Standard SIM cards.

▪ Other LDOs

The RF module has implemented several LDO's for different RF Power domain.

The mixed signal module has some LDO's for the audio driver and microphone supply.

Supply Domain LDO Name	Voltage	Max. Current	Output Cap	Input Domain	Comment
VBAT	0 ... 6.0 V				Operating range is 3.05 V ... 5.5 V, system emergency switch off voltage is about 2.8 V
VDD1V8	1.8 V	450 mA	22 µF	VBAT	This voltage is generated by the DC/DC converter with 3.3 µH inductor, The voltage is used for: Memory supply, and via LDO's for digital core supply, mixed signal supply and RF supply.
LCORE	1.2 V	300 mA	2x100 nF	VDD1V8	
LANA	1.3 V	10 mA	No	VDD1V8	No ball
LRTC	2.3 V	2 mA	>=100 nF	VBAT	This supply is only used for the HPBG, the 32.768 kHz oscillator and the real-time clock counter required during the sleep- and low-power mode.
LPMU	1.2 V	15 mA	100 nF	VBAT	Supply for the digital part of the PMU including digital control of DC/DC converter. This voltage is also used for the N-DEMOS driver of DC/DC converter and the class-D amplifier and the core PLL.
LUSB	3.1 V	40 mA	100 nF	VBAT	Used for the USB driver supply or as general purpose LDO with programmable output voltages (2.5 V, 2.85 V, 3.1 V)
LAUX	1.5 V ... 2.85 V	150 mA	470 nF	VBAT	General purpose LDO for e.g. Display, Bluetooth, Camera etc. Programmable output voltages are (1.5 V, 1.8 V, 2.5 V, 2.85 V)
LSIM	1.8 V / 2.85 V	30 mA	>=100 nF	VBAT	LDO dedicated to the SIM-Card supply. It is chip internal connected to the SIM interface driver.
LMMC	1.5 V ... 2.85 V	150 mA	>=470 nF	VBAT	General purpose LDO, targeted for MMC/SD card supply.
VDDNEG	-1.3 V	100 mA	100 nF	VDD1V8	Negative voltage for the bipolar headset audio driver. Generated by a charge pump.

Table. 3-2-1 Power supply Domains (without RF)

3.2.1 Power on and startup

▪ **Analog startup Circuit**

Because the POR circuit and the LPBG are directly connected to the battery, it is not possible to switch them off. If the battery voltage exceed the power on reset threshold (2.5V), the power on reset is released, the LPMU regulator and the LRTC voltage regulator are switched on. The LPMU regulator starts in its ultra-low power mode.

The LPMU regulator generates a control signal (lpmu_OK) that enables the 50KHZ PMU oscillator. The output clock of the oscillator is checked with a fully coded counter. A counter overflow releases the reset (vpmu_rst_n) signal for the small PMU state-machine.

▪ **Small first digital State-Machine**

The small PMU state-machine is always connected to VPMU After starting from reset the small startup state machine enters the SYSTEM OFF state and only continuous the startup procedure if a switch on event like first connect, on-key, wake up or charge detect occurs.

▪ **PMU-main State-Machine**

The main PMU state-machine is always connected to VPMU also. The power up sequence driven by the PMU state-machine can be seen in Figure18. After enabling the reference (HPGB) and waiting for the settling time, the battery voltage is measured and compared with the power on threshold. If the battery voltage is high enough, the SD1 DC/DC converter and the LCORE LDO are started. A timer ensures that the supply voltage will be stable before the DCXO is enabled. The DCXO settling time is ensured using a fixed timer. After an overflow of this timer, the reset is released for the rest of the system. The PMU state machine remains in this System-ON state until the system is switched into the OFF state. For example the system sleep mode is completely configured by software(for example switching off the LDO's, switching of the DCXO etc.) and controlled by the VCXO_enable signal. The reason for the startup is stored in the ResetSourceRead register.

▪ **Battery Measurement**

The ADC and the oscillator for the ADC needs the VDD_ADC supply voltage from the LADC LDO. LADC uses either the charger voltage VDD_CHARGE or VDDRTC as input voltage. The input voltage is selected automatically by a bulk switch circuit. LADC, the ADC and the oscillator are enabled on request for every battery measurement if the charger unit is not running. This is handled by an ADC control block in one of the state-machines. If the charger unit is running the ADC is controlled by the charger state-machine

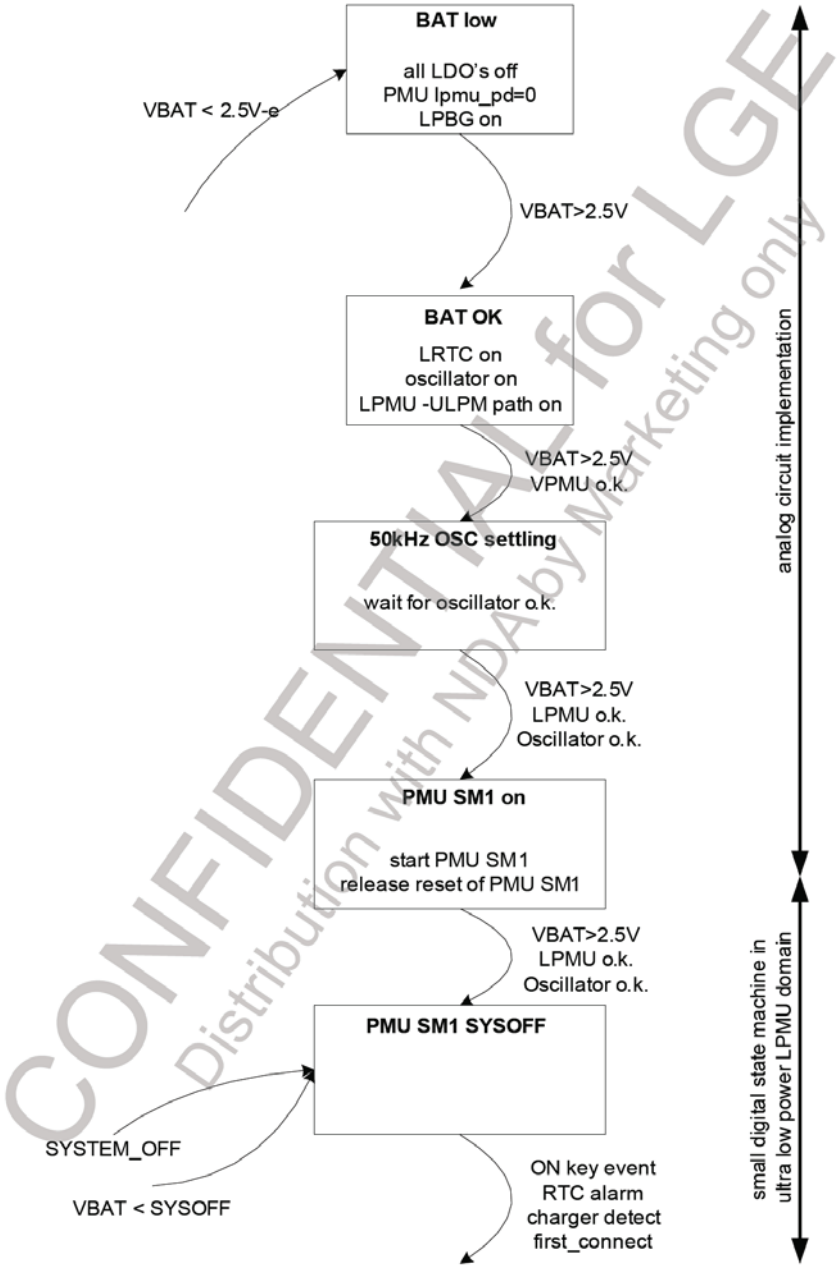


Figure.3.2.1 First Part of the State Machine, Running in Different Power Domains than the Second Part

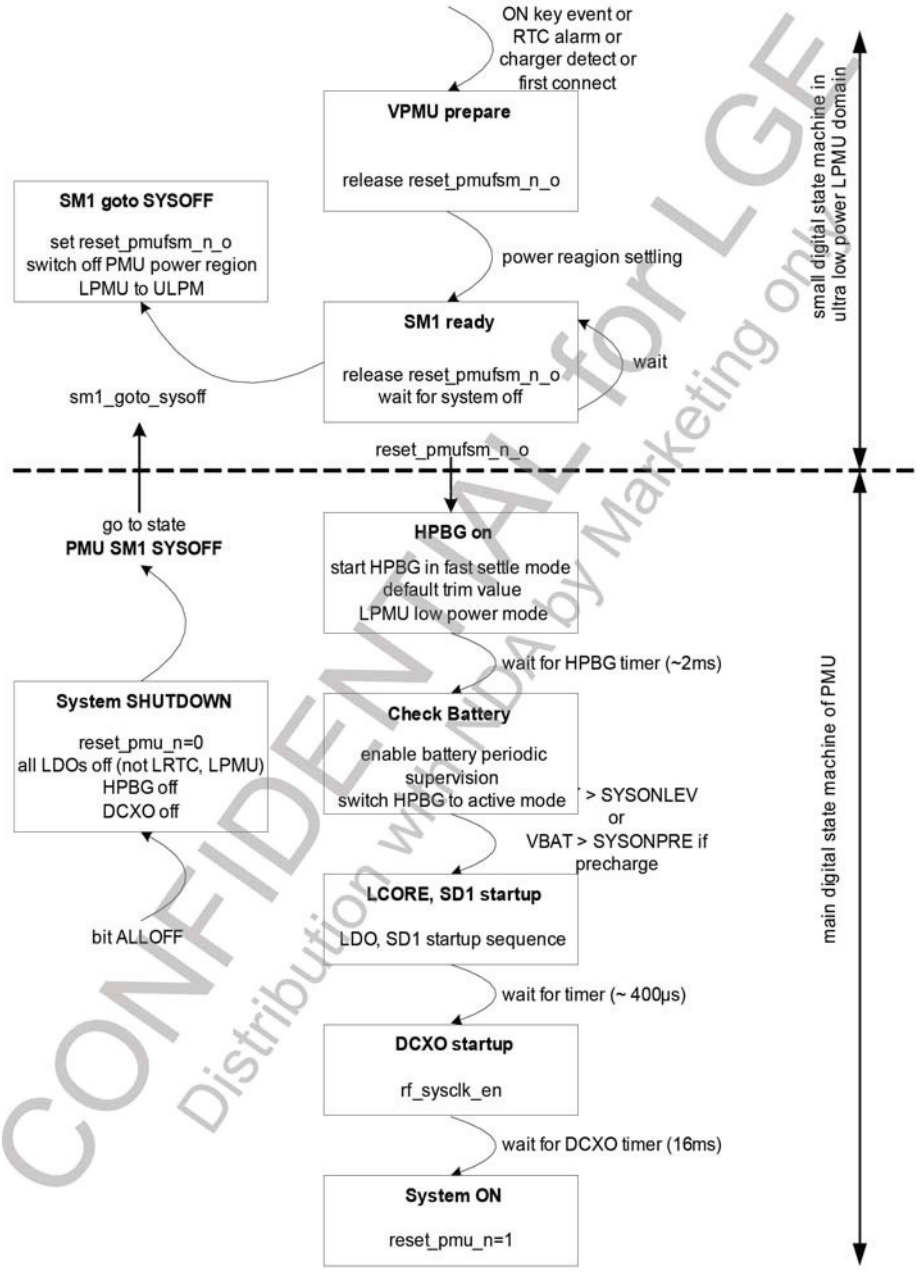


Figure 3.2.2 Second (Main) Part of the Startup State Machine in the VPMU Domain

3.2.2 Switching on due to first connect

If the battery voltage is connected the first time, that means the system enters the first time the SYSOFF state, this is stored in a first connect flag. If the first connect flag is set, the system will start immediately and not wait for any other system on event in the SYSOFF state.

3.2.3 Switching on due to on-Key event

The on key is connected to the ONKEY pad. The ESD protection and the input structure of this pad are connected to VRTC. If the ONKEY pad is forced to VRTC by an external key or similar circuit, the system starts. The ONKEY is sampled with the PMU clock. It has to be sampled four times high before a valid on event is generated. The status of the ON key can be read in the PMU registers, so it can be used as a functional key during phone operation also

3.2.4 Switching on due to RTC alarm

The real time clock can generate a wakeup signal called RTC alarm. This signal is sampled from the state-machine and after successfully detecting a high, the system is switched on.

3.2.5 Switching on due to charging

When a battery with a voltage below the SSONLEV level is inserted, the state machine will not start the system. As long as the battery voltage stays lover than SYSONLEV the system will stay off. The only possibility to start up the system is due to an external charger.

If an external charger is connected and detected and the battery is charged above the SYSONPRE voltage level the system will start up.

The PMU main state machine waits in the Check battery state until the battery voltage condition is fulfilled. The charger state machine provides the necessary pre-charge indication signal. This pre-charge signal is denounced in a small counter to have a stable signal. This is important, especially in half/full-wave charging where the charger detection is switching between charger detected/not detected according the AC supply frequency. reasons
For details on pre-charging see the charger chapter. The charger is controlled by an independent state machine. The pre-charge signal is used to trigger the pre-charge signal is used to trigger the pre-charge functionality. The charger state machine fully control the pre-charge, the PMU-state machine now changes to state HPBG on state and the system starts. This state change is indicated to the charger state-machine to enable the charger watchdog for safety

3.2.6 Power Supply Start-up sequence

In order to avoid an excessive drop on the battery voltage caused by in-rush current during system power-on, possibly leading to system instability and “hick-ups” a staggered turn-on approach for the regulators is implemented. The regulators are turned on in a well defined sequence, thus spreading the in-rush current transients over time.

The IO’s of X-GOLD TM 215 are isolated in OFF mode (core supply is off). The isolation signal is controlled by the PMU state machine. This ensures that the PADs are in a well defined state during core supply settling. This allows to power up the LCORE core regulator and wait for the core to reach reset state before powering up the I/O supply regulators.

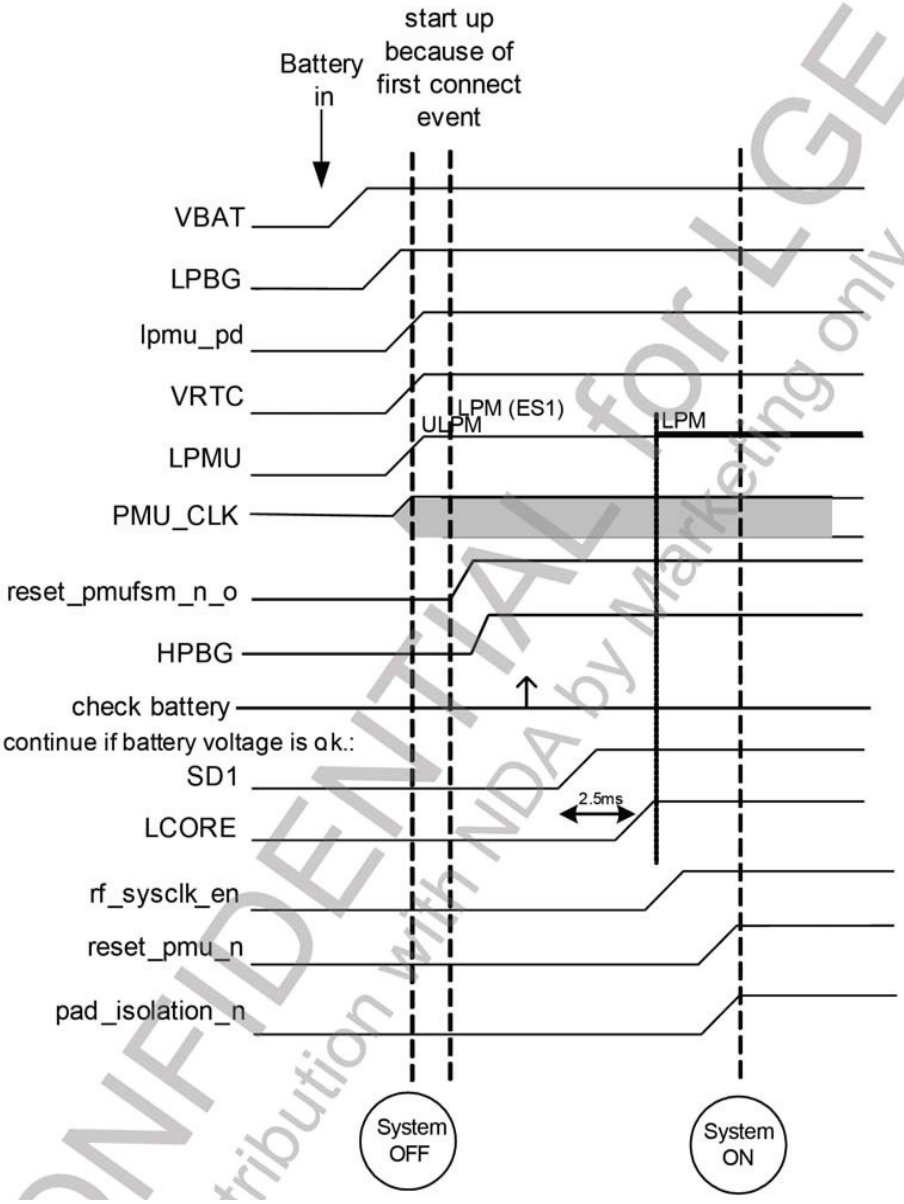


Figure 3.2.3 Start Up Sequence (triggered by First Connect Event)

3.2.7 External Reset Handling

The chip reset can be controlled by an external RESET_N ball. If this ball is pulled low, the chip will be reset. All PMU registers are reset during the external reset including LSIM control bits. The PMU statemachines are also not reset from the external reset. An SW or watchdog reset will not reset the PMU registers.
A SW and Watchdog reset is seen on the reset_n pad to allow the reset of external devices. Basically there are three reset sources, first the reset signal controlled by the PMU (reset_pmu_n_o), second the reset signal controlled by the SCU (resetout_o) and third the external reset (RESET_N). The SCU reset is triggered by SW (for example due to a SW reset or watchdog reset). The PMU reset is controlled by the PMU state machine.
The output of the reset handling block is the reset_postscu_n_o signal. This signal controls for example the µC subsystem and releases reset for the controller. During normal start up, the PMU releases the reset_pmu_n_o signal after entering the SYSTEM ON state. At this time the resetout_o signal is high, the RESET_N pad is not pulled low and therefore the reset_postscu_n_o signal follows the reset_pmu_n_o signal. That means the µC reset will be released and the µC starts operation. If the SW triggers an external reset via the SCU, signal resetout_o will be forced to low for a certain time and RESET_N will be forced to low by the open drain driver. At the same time the feedback to the SCU will be masked to not reset the baseband.
The RESET_N pad is in the VDDRTC domain but the internal pull up is connected to the VDD_VDIG1 (1.8V) domain. That allows the pad to be used as reset for external devices running in the VDD1V8 domain. The RESET_N pad can also be used to monitor the chip internal reset condition during startup.

The open drain driver is a weak driver, that means it can be forced to high during debug from external pushing some current into the pad. In testmode signal reset_pmu_n_o is high, that means the chip reset is fully controlled from external

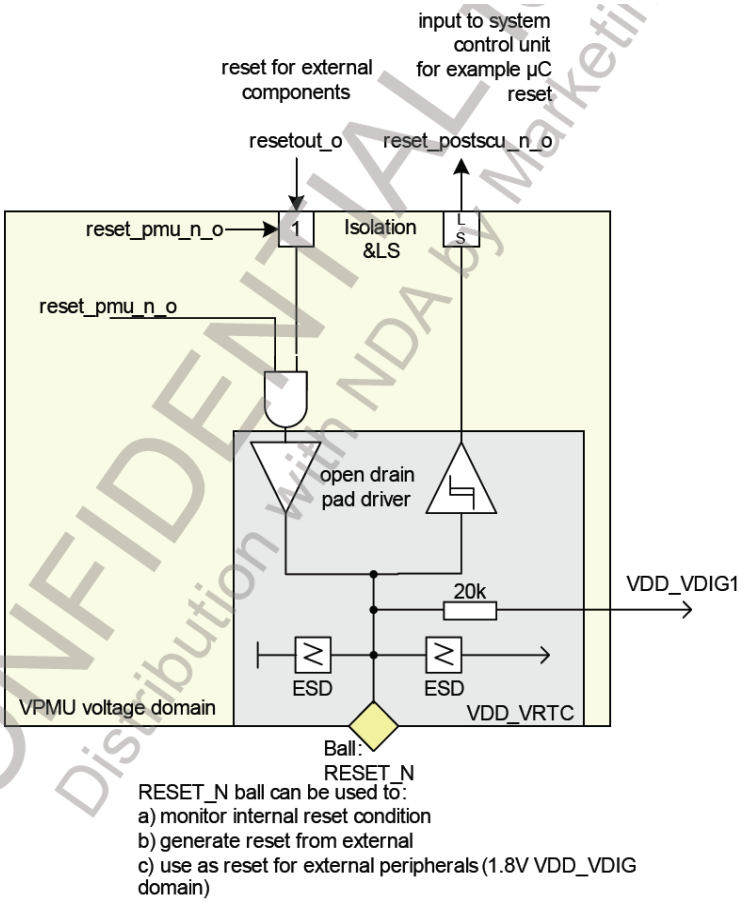


Figure 3.2.4 PMU, CGU and External Reset

3.2.8 Sysclock Switching

The PMU controls the rf_sysclk_en signal of the DCXO in the RF macro. During startup the PMU enables the DCXO. After the system is running the DCXO is controlled by the SCU of the baseband by using the vcxo_enable signal. This is handled by a dedicated logic in the PMU, see **Figure 21**. As long as rf_sysclk_en_pmu, the output of the PMU state-machine is high, vcxo_enable controls the rf_sysclk_en signal to the RF. If rf_sysclk_en_pmu is low, the DXCO is switched off, independent from vcxo_enable.

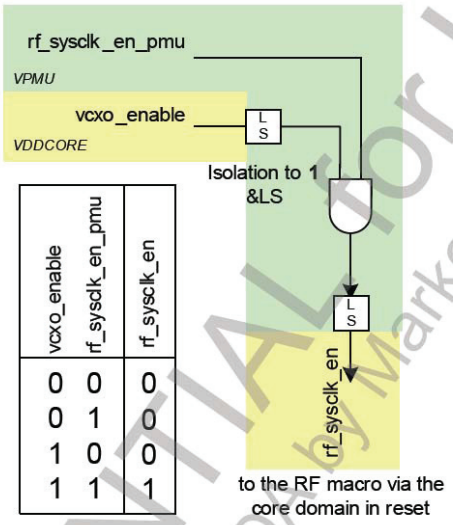


Figure 3.4.2 How sysclock Enable is Routed in the PMU

3.2.9 Undervoltage Shutdown

In active mode the PMU periodically measures the battery voltage using the ADC from the charger unit. If the battery is measured to be below the programmable shut-down level (called SYSOFF), the system changes to OFF mode. This is done via the SHUTDOWN state of the PMU state machine. (see chapter switch OFF)

3.2.10 Software Reset

A software reset does not affect any PMU register. The PMU register are reset with the reset_pmufsm_n_o signal. That means all PMU register are reset in OFF state. For details about the SW reset see chapter **External Reset Handling** .

3.2.11 PMU Clock

During the first startup (for example plugging in a battery) a PMU internal oscillator is used for generation of the PMU clock (pmu_clock). The frequency is slightly above 32 kHz (typ. 50 kHz) to be out of the audio band also for worst case devices. After first startup the software shall enable the 32 kHz crystal oscillator. It is not possible to use the 32 kHz oscillator during first startup, because the settling time of the oscillator can be quite long. After the 32 kHz oscillator is running and settled the software shall switch the PMU clock to the 32 kHz clock and disable the internal PMU oscillator for power saving reasons. The 32 kHz oscillator shall never be disabled after the PMU clock has been switched. The ADC in the charger unit has it's own oscillator generating a frequency of about 10 MHz. This oscillator is running during charging and during battery measurements triggered by the PMU. It is off otherwise.

3.2.12 System Sleep Mode

The sleep mode is controlled by using the VCXO_enable signal. This signal is used to switch the LDO's and the DC/DC converter SD1 in a programmable way into its low power mode (PFM). In addition DC/DC converter SD1 can be configured to change the output voltage to a lower value for additional power saving. VCXO_enable is also used to deactivate the HPBG and setting LDO LPMU in the ultra-low-power mode. In addition the DCXO is switched off by the VCXO_enable signal. The VCXO_enable signal is also used to switch some LDO's (software configured) to sleep and/or off mode or to change the output voltages of said LDO's. The state of the main PMU state machine is not changed due to VCXO_enable.

3.2.13 DC/DC Pre-Load Register Handling

The DC/DC converter works in different modes. If the mode is switched from PFM to PWM the pulse-width of the DC/DC converter depends on the current battery voltage (and on the output voltage). The PMU state-machine knows the battery voltage because of the battery supervision function. Depending on this value it selects a startup pulse-width for the DC/DC converter out of a register table. (4-values)

3.2.14 Power Down Sequence

Setting bit OFF in the GeneralControl register switches the system into OFF mode. After the turn off event, the state-machine switches to the SHUTDOWN state. The reset_pmu_n_o signal changes to low, the I/O pads are isolated using the padisolation_n signal, the LCORE LDO and the SD1 DC/DC converter are switched off, the LPMU LDO is switched to ultra-low power mode, the DCXO is turned off and the bandgap buffer is disabled. Before switching OFF the software shall have enabled the 32 kHz oscillator and has switched the PMU clock to the 32 kHz clock to archive the target OFF current .

3.3 FEM with integrated Power Amplifier Module (RF7171, U101)

3.3.1 Internal Block Diagram

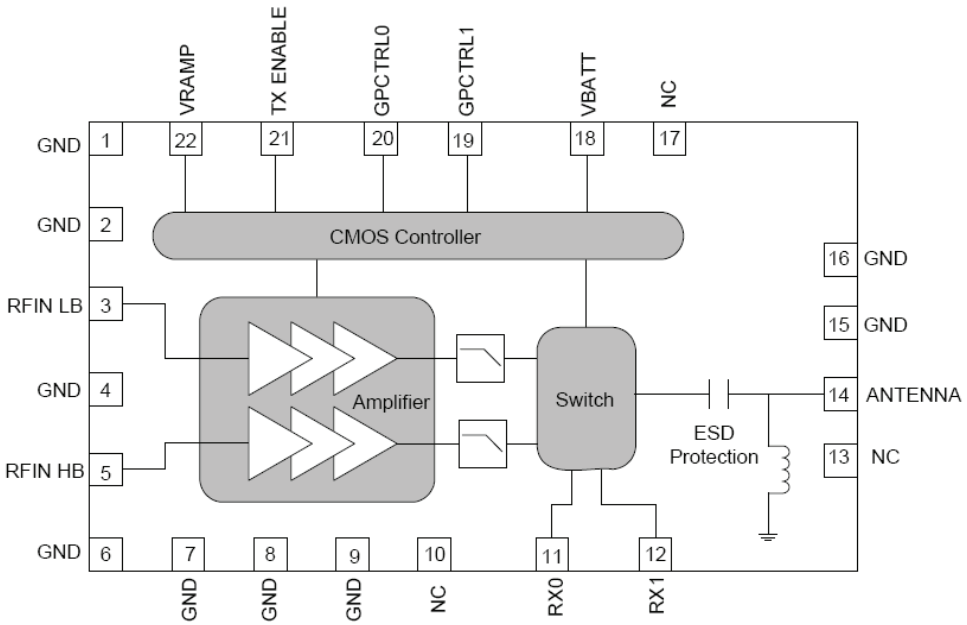


Figure. 3-3-1 RF7171 FUNCTIONAL BLOCK DIAGRAM

3.3.2 General Description

The RF7171 is a quad-band (GSM850/EGSM900/DCS1800/PCS1900) GSM/GPRS, Class 12 compliant transmit module with two interchangeable receive ports. This transmit module builds upon RFMD's power amplifier with PowerStar® integrated power control technology, pHEMT switch technology, and integrated transmit filtering for best-in-class harmonic performance.

The device is designed for use as the final portion of the transmitter section in a GSM850/EGSM900/DCS1800/PCS1900 handset and eliminates the need for a PA-to-antenna switch module matching network.
The RF7171 features RFMD's latest integrated power-flattening circuit which significantly reduces current and power variation into load mismatch. Additionally, a VBATT tracking feature is incorporated to maintain switching performance as supply voltage decreases.
The RF7171 also integrates an ESD filter to provide ESD protection at the antenna port.
The RF7171 is designed to provide maximum efficiency at rated Pout.

TX ENABLE	GpCtrl1	GpCtrl0	TX Module Mode
0	0	0	Low Power Mode (Standby)
0	1	0	RX0
0	1	1	RX1
1	1	0	GSM850/900 TX Mode
1	1	1	DCS1800/PCS1900 TX Mode

Figure 3.3.2 Band SW Logic Table

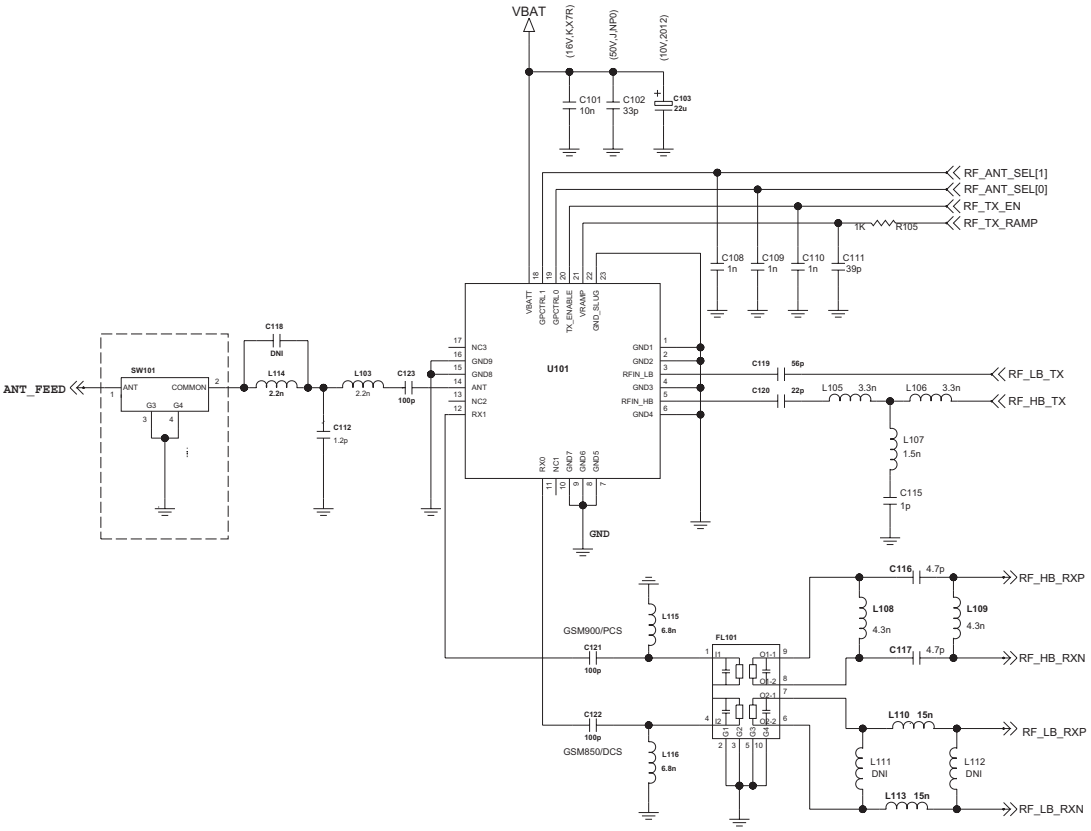


Figure 3.3.3 FEM CIRCUIT DIAGRAM

3.4 Crystal(26 MHz, X201)

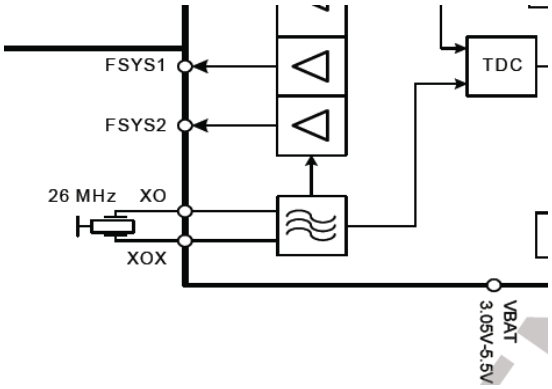


Figure. 3.4.1 Crystal Oscillator External Connection

The X-GOLDTM215 RF-Subsystem contains a fully integrated 26 MHz digitally controlled crystal oscillator, designed for 8 pF crystals. The only external part of the oscillator is the crystal itself. Overall pulling range of the DCXO is approximately ±55 ppm, controllable by a 13-bit tuning word.

This frequency serves as comparison frequency within the RF-PLL and as clock frequency for the digital circuitry.
The 26 MHz reference clock can also be applied to external components like Bluetooth or GPS, via the two buffered output signals FSYS1 and FSYS2

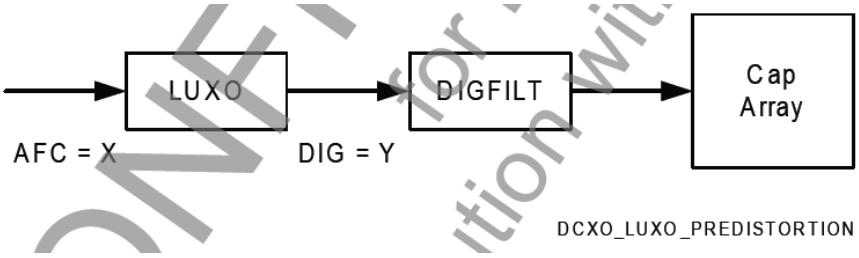


Figure. 3.4.2 Digital PREDISTORTION with LUXO

The DCXO tuning characteristic should be a first order linear function of the programming word AFC. The variable capacitance array is a first order linear function of the digital word DIG, which leads to a nonlinear curve ppm vs. DIG (and also a nonlinear ppm vs. AFC for DIG=AFC). In order to linearize the ppm vs. AFC curve the implementation of a predistortion is necessary.
To get the wanted linear ppm vs. AFC tuning curve some digital predistortion of the AFC word is required. This predistortion is performed by the linearization unit for crystal oscillator (LUXO). The LUXO calculates the corresponding DIG value according to the given AFC value.

3.5 RF Subsystem of PMB8815 (U201)

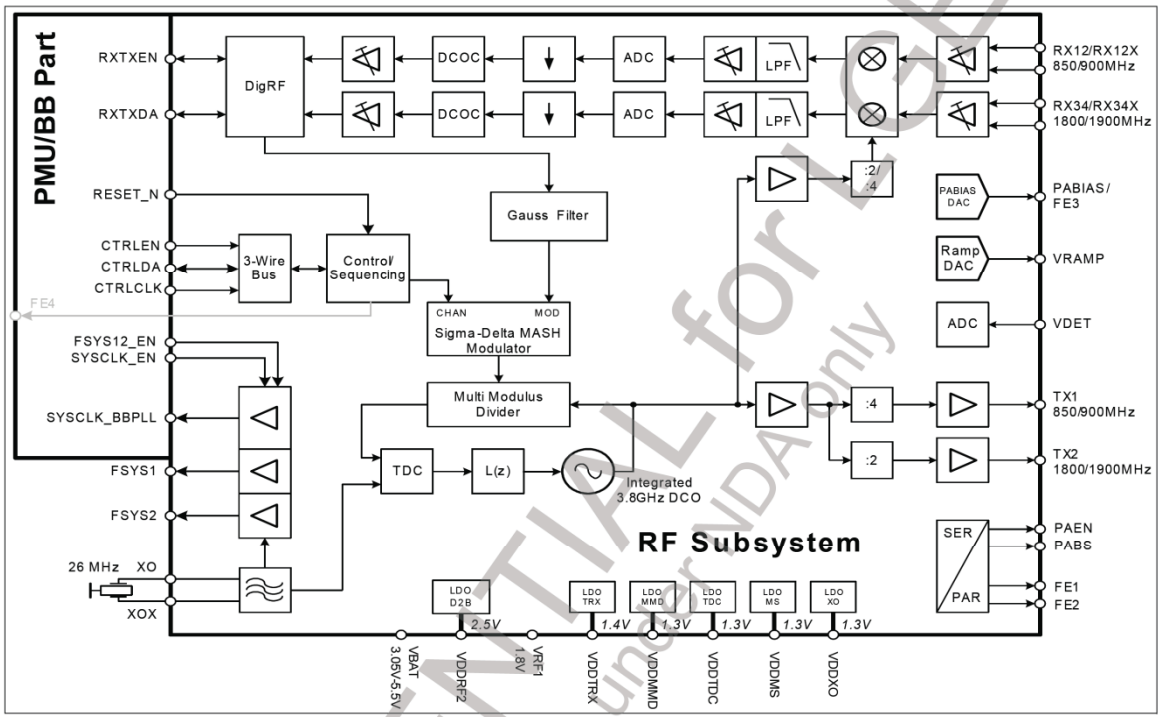


Figure. 3-5-1 Block DIAGRAM of RF Subsystem

3.5.1 GENERAL DESCRIPTION

The PMB8815 RF subsystem is designed for dual-band GSM voice and data applications (GPRS class 12). The system can be configured to support one low band, GSM850 or EGSM900, and one high band, DCS1800 or PCS1900. A block diagram of the RF subsystem is given in Figure 3-4-1.

3.5.2 FUNCTIONAL DESCRIPTION

3.5.2.1 Receiver

The X-GOLD™215 dual-band receiver is based on a Direct Conversion Receiver (DCR) architecture. Input impedance of the LNAs is optimized to achieve a matching without (external) high quality inductors. By use of frequency dividers (by 2/4) the LO frequency is derived from the RF frequency synthesizer.

The receive path is fully differential to suppress the on-chip interferences and reduce DC-offsets. The analog chain of the receiver contains two LNAs (low/high band), a quadrature mixer followed by an analog baseband filter and 14-bit continuous-time delta-sigma analog-to-digital converter. The filtered and digitized signal is fed into the digital signal processing chain, which provides decimation, DC offset removal and programmable gain control.

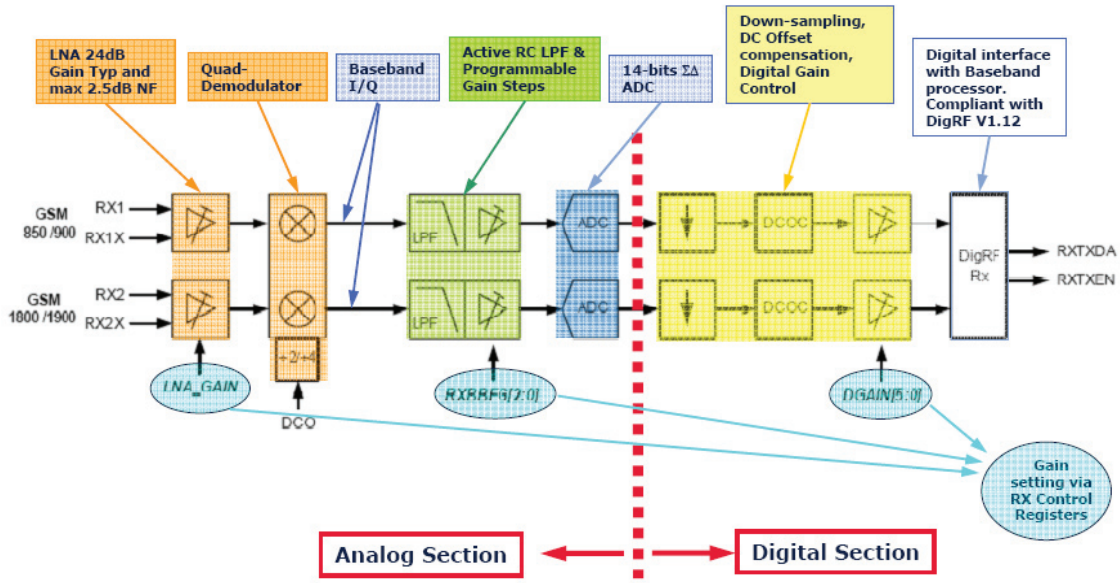


Figure. 3.5.2 RECEIVER CHAIN BLOCK DIAGRAM

3.5.2.2 Transmitter

The GMSK transmitter supports power class 4 for GSM850 or GSM900 as well as power class 1 for DCS1800 or PCS1900. The digital transmitter architecture is based on a fractional-N sigma-delta synthesizer for constant envelope GMSK modulation. This configuration allows a very low power design without any external components.

Up- and down-ramping is performed via the ramping DAC connected to VRAMP.

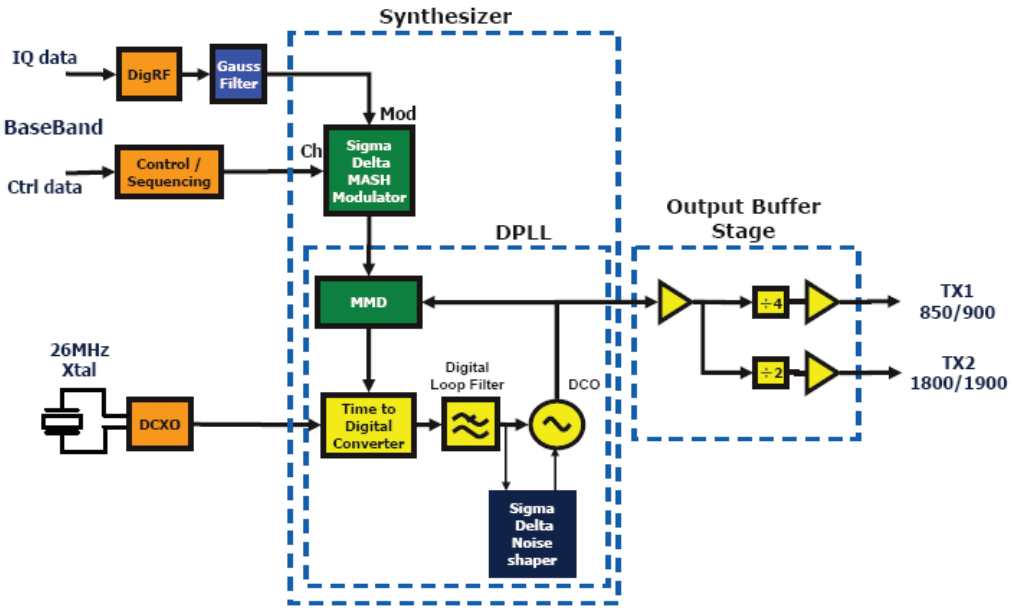


Figure. 3.5.3 TRANSMITTER CHAIN BLOCK DIAGRAM

RF synthesizer

The RF subsystem contains a fractional-N sigma-delta synthesizer for the frequency synthesis. Respective to the chosen band of operation the phase locked loop (PLL) operates at twice or forth of the target signal frequency. In receive operation mode the divided output signal of the digital controlled oscillator output (DCO) serves as local oscillator signal for the balanced mixer. For transmit operation the fractional-N sigma-delta synthesizer is used as modulation loop to process the phase/frequency signal. The 26 MHz reference signal of the phase detector incorporated in the PLL is provided by the reference oscillator.

3.5.2.3 Front-end/PA Control Interface

Two outputs (FE1, FE2) for direct control of antenna switch modules enable to select RX- and TX-mode as well as low- and high-band operation.

An extra band select signal PABS for the power amplifier is used, to support discrete PA and switching modules. Time accurate power dissipation of the PA is achieved by the control signal PAEN.

A minor set of power amplifiers require a bias voltage to enhance power efficiency. Support of this power amplifiers is achieved by the implemented bias DAC.

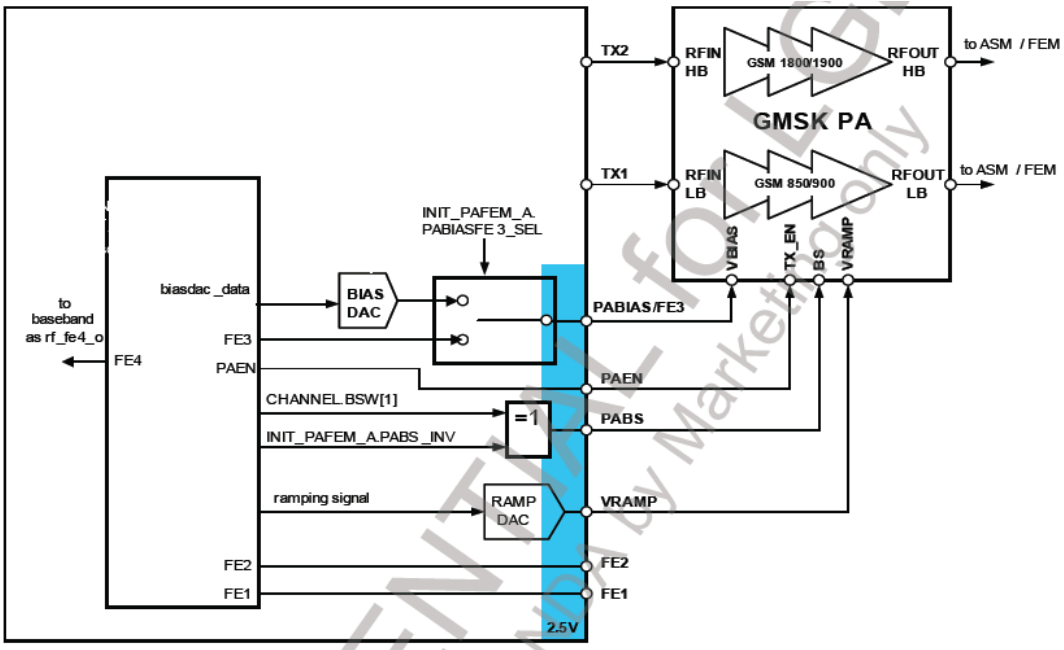


Figure. 3.5.4 PA AND FEM CONTROL BLOCK DIAGRAM

3.5.2.4 Power Supply

To increase power efficiency most parts of the RF subsystem are supplied by the DCDC converter situated in the PMU subsystem. Conversion of the 1.8 V output voltage of the DCDC to the 1.3 V/1,4 V circuit supply voltages is achieved by several Low-DropOut regulators (LDO).

One embedded direct-to-battery LDO provides the 2.5 V supply voltage for the remaining circuits.

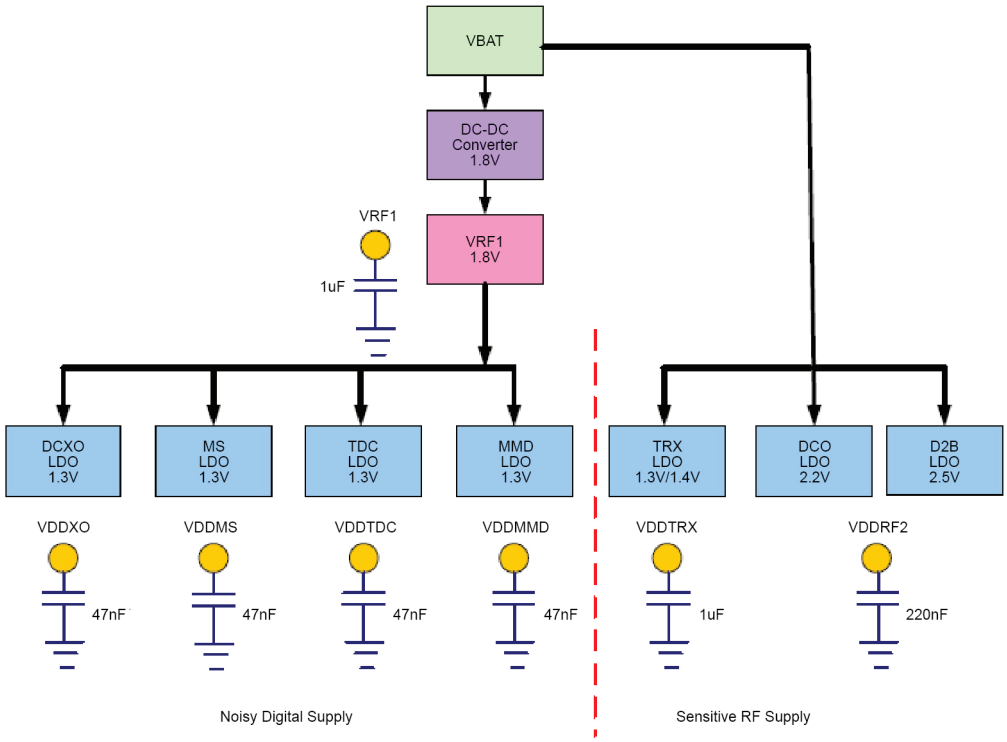


Figure. 3.5.5 POWER SUPPLY BLOCK DIAGRAM

3.6 MEMORY(H9DA2GH1GHMMMR, U301)

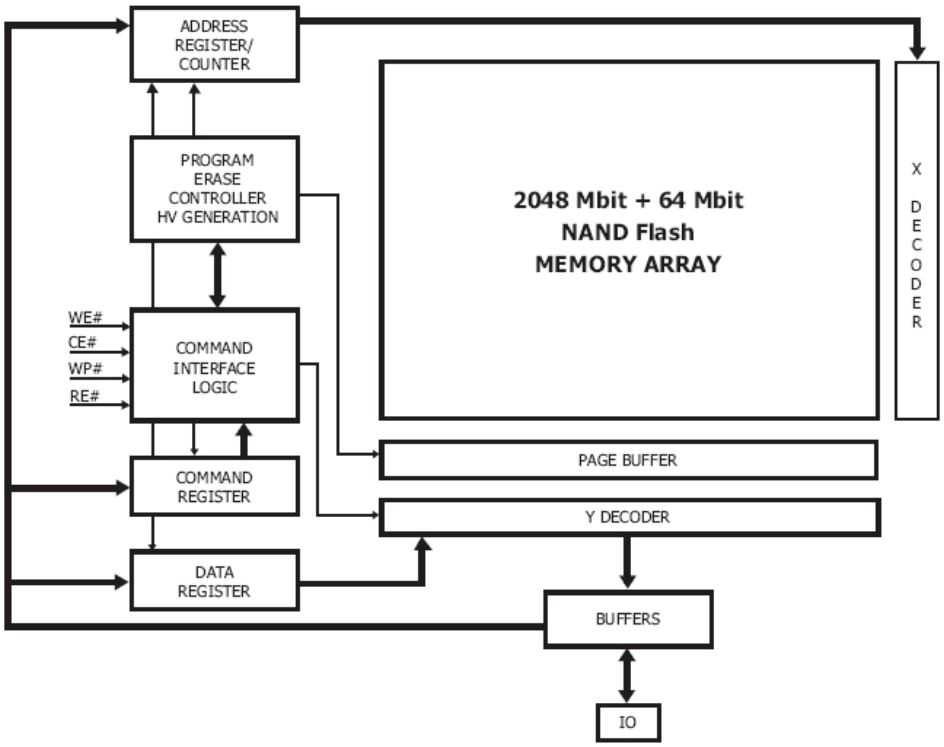


Figure. 3.6.1 MEMORY BLOCK DIAGRAM

Hynix NAND Flash is a 128Mx16bit with spare 4Mx16 bit capacity.
The device is offered in 1.8 Vcc Power Supply, and with x16 I/O interface.
Its NAND cell provides the most cost-effective solution for the solid state mass storage market.
The memory is divided into blocks that can be erased independently so it is possible to preserve valid data while old data is erased.
The device contains 2048 blocks, composed by 64 pages.
Memory array is split into 2 planes, each of them consisting of 1024 blocks.
Like all other 2KB - page NAND Flash devices, a program operation allows to write the 2112-byte page in typical 250us and an erase operation can be performed in typical 3.5ms on a 128K-byte block.
In addition to this, thanks to multi-plane architecture, it is possible to program 2 pages at a time (one per each plane) or to erase 2 blocks at a time (again, one per each plane). As a consequence, multi-plane architecture allows program time to be reduced by 40% and erase time to be reduction by 50%. In case of multi-plane operation, there is small degradation at 1.8V application in terms of program/erase time..

[NAND Flash]

• MULTIPLANE ARCHITECTURE
• SUPPLY VOLTAGE
  - Vcc = 1.7 - 1.95 V
• MEMORY CELL ARRAY
  - (1K + 32) Words x 64 pages x 2048 blocks
• PAGE SIZE
  - (1K+ 32 spare) Words
• BLOCK SIZE
  - (64K + 2K spare) Words
• PAGE READ / PROGRAM
  - Random access : 25us (max.)
  - Sequential access : 45ns (min.)
  - Page program time : 250us (typ.)
  - Multi-page program time (2 pages): 250us (Typ.)
• BLOCK ERASE / MULTIPLE BLOCK ERASE
  - Block erase time: 3.5 ms (Typ)
  - Multi-block erase time (2 blocks): 3.5ms (Typ.)
• SEQURITY
  - OTP area
  - Sreial number (unique ID)
  - Hardware program/erase disabled during
  - power transition
• ADDITIONAL FEATURE
  - Multiplane Architecture:
    Array is split into two independent planes.
    Parallel operations on both planes are available, having program and erase time.
  - Single and multiplane copy back program with auto matic EDC (error detection code)
  - Single and multiplane page re-program
  - Single and multiplane cache program
  - Cache read
  - Multiplane block erase
• RELIABILITY
  - 100,000 Program / Erase cycles (with 1bit /528Byte ECC)
  - 10 Year Data retention
• ONFI 1.0 COMFLIANT COMMAND SET ELECTRICAL SIGNATURE
  - Munufacture ID: ADh
  - Device ID

[DDR SDRAM]

- Double Data Rate architecture
  - two data transfer per clock cycle
- x16 bus width
- Supply Voltage
  - VDD / VDDQ = 1.7 - 1.95 V
- Memory Cell Array
  - 16Mb x 4Bank x 16 I/O
- Bidirectional data strobe (DQS)
- Input data mask signal (DQM)
- Input Clock
  - Differential Clock Inputs (CK, /CK)
- MRS, EMRS
  - JEDEC Standard guaranteed
- CAS Latency
  - Programmable CAS latency 2 or 3 supported
- Burst Length
  - Programmable burst length 2 / 4 / 8 with both sequential and interleave mode

3.7 BT module

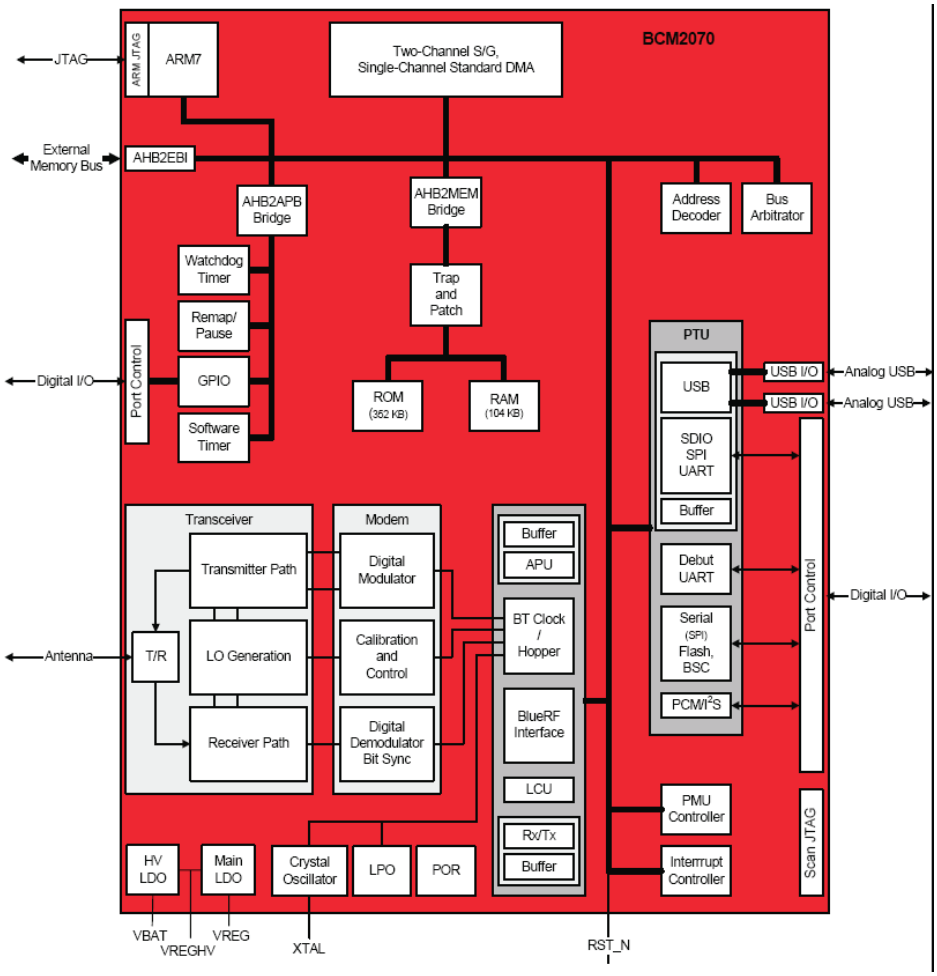


Figure 3_7_1. BT BLOCK DIAGRAM

This module has an integrated radio transceiver that has been optimized for use in 2.4GHz Bluetooth Wireless systems. It has been designed to provide low-power, robust communications for applications Operating in the globally available 2.4GHz unlicensed ISM band. It is fully compliant with the Bluetooth Radio Specification and enhanced data rate specification and meets or exceed the requirement to provide the highest communication link quality of service.

3.7.1 Transmitter path

This module features a fully integrated zero IF transmitter. The baseband transmitted data Is digitally modulated in the modem block and up-converted the 2.4GHz ISM band in the Transmitter path. The transmitter path consists of signal filtering, I/Q up-conversion, high -output power amplifier(PA), and RF filtering. It also incorporates modulation schemes P/4-DQPSK for 2 Mbps and 8-DPSK for 3 Mbps to support enhanced data rate.

• Digital modulator

The digital modulator performs the data modulation and filtering required for the GFSK, π/4DQPSK, and 8-DPSK signal. The fully digital modulator minimizes any frequency drift or anomalies in the modulation characteristics of the transmitted signal and is much more Stable than direct VCO modulation schemes.

• Power Amplifier

The integrated PA for the BCM2070 is configurable for Class 2 operation, transmitting up to +4 dBm as well as Class 1 operation and transmit power up to +12 dBm at the chip, gFSK, >2.5V supply. Due to the linear nature of the PA, combined with some integrated filtering, no External filters are requires for meeting Bluetooth and regulatory harmonic and spurious requirements. For integrated mobile handset applications, where Bluetooth is integrated next to the celluar radio, minimal external filtering can be applied to achieve near thermal noise levels for spurious and radiated noise emissions.
Using a highly linearized, temperature compensated design the PA can transmit +12 dBm for Basic rate and +10 dBm for enhanced data rates(2 to 3 Mbps). A flexible supply voltage range Allows the PA to operate from 1.2V to 3.0V. The minimum supply voltage at VDDTF is 1.8V to achieve +10dBm of transmit power.

3.7.2 Receiver path

The receiver path uses a low IF scheme to down-convert the received signal for demodulation in the digital demodulator and bit synchronizer. The receiver path provides a high degree of Linearity, an extended dynamic range, and high order on-chip channel filtering to ensure reliable operation in the noisy 2.4GHz ISM bnad. The front-end topology, with built-in out -of-bnad attenuation, enables the device to be used in most applications with no off-chip Filtering.
For integrated handset operation where the Bluetooth function is integrated close to the celluar transmitter, minimal external filtering is required to eliminate the desensitization of the receiver by the cellular transmit signal.

3.8 SIM Card Interface

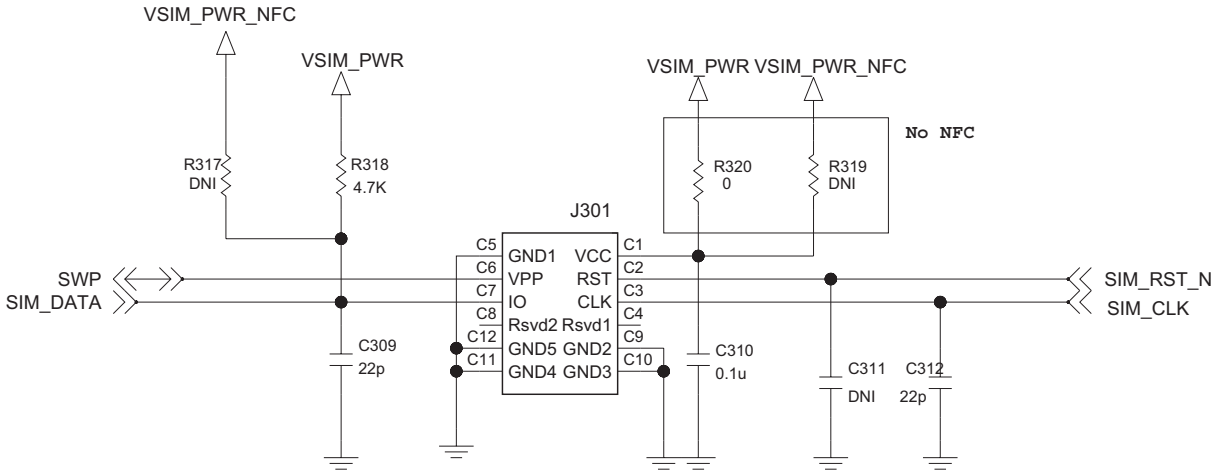


Figure 3-8-1. SIM CARD Interface

The Main Base Band Processor(XMM215) provides SIM Interface Module.
The XMM215 checks status Periodically During established call mode whether SIM card is inserted or not, but it doesn't check during deep sleep mode. In order to communicate with SIM card, 3 signals SIM_DATA, SIM_CLK, SIM_RST_N.
And This model supports 1.8/3V SIM Card.

Signal	Description
SIM_RST_N	This signal makes SIM card to HW default status.
SIM_CLK	This signal is transferred to SIM card.
SIM_DATA	This signal is interface datum.

3.9 LCD Interface

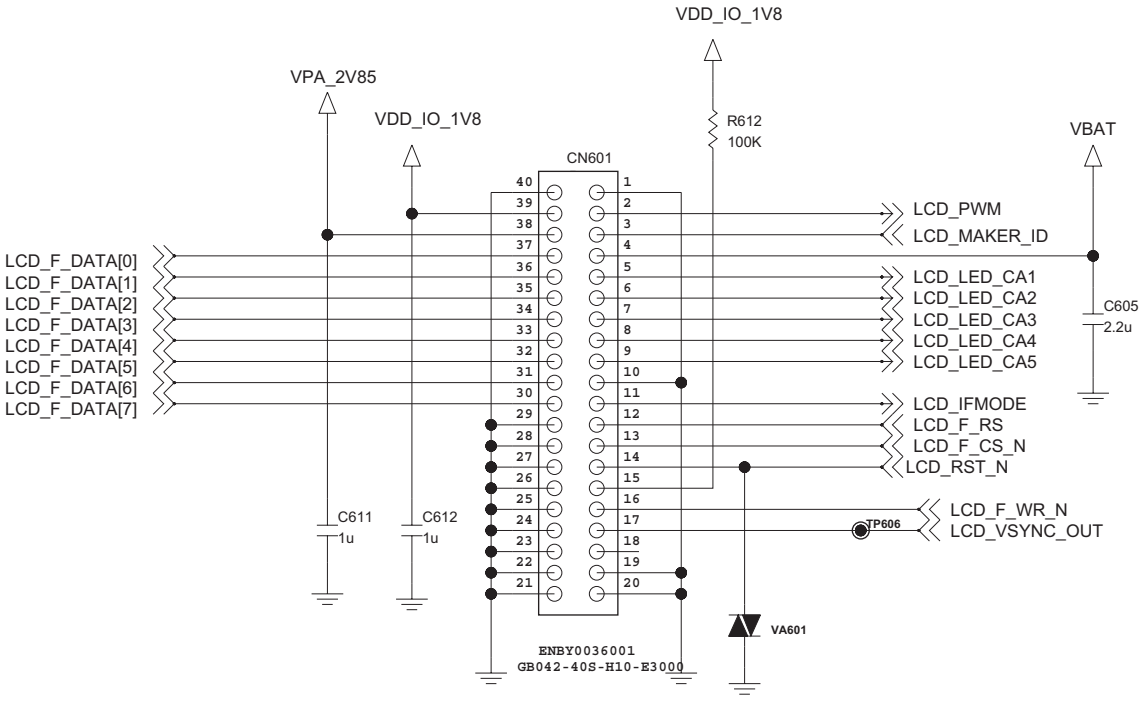


Figure 3-9-1. LCD Interface (B to B Connector on Main PCB)

The LM283DN2A module is a Color Active Matrix Liquid Crystal Display with an Light Emission Diode(LED) Back Light system. The matrix employs a-Si Thin Film Transistor as the active element.
It is a transmissive type display operating in the normally Black mode. This TFT-LCD has a 2.83 inch diagonally measured active display area with 240 * RGB * 320 resolution. Each pixel is divided into R,G,B dots which are arranged in vertical stripes. Gray scale or the brightness of the dots Color is determined with a 6 bit gray scale signal for each dot, thus, presenting a palette of More than 262,144 colors.

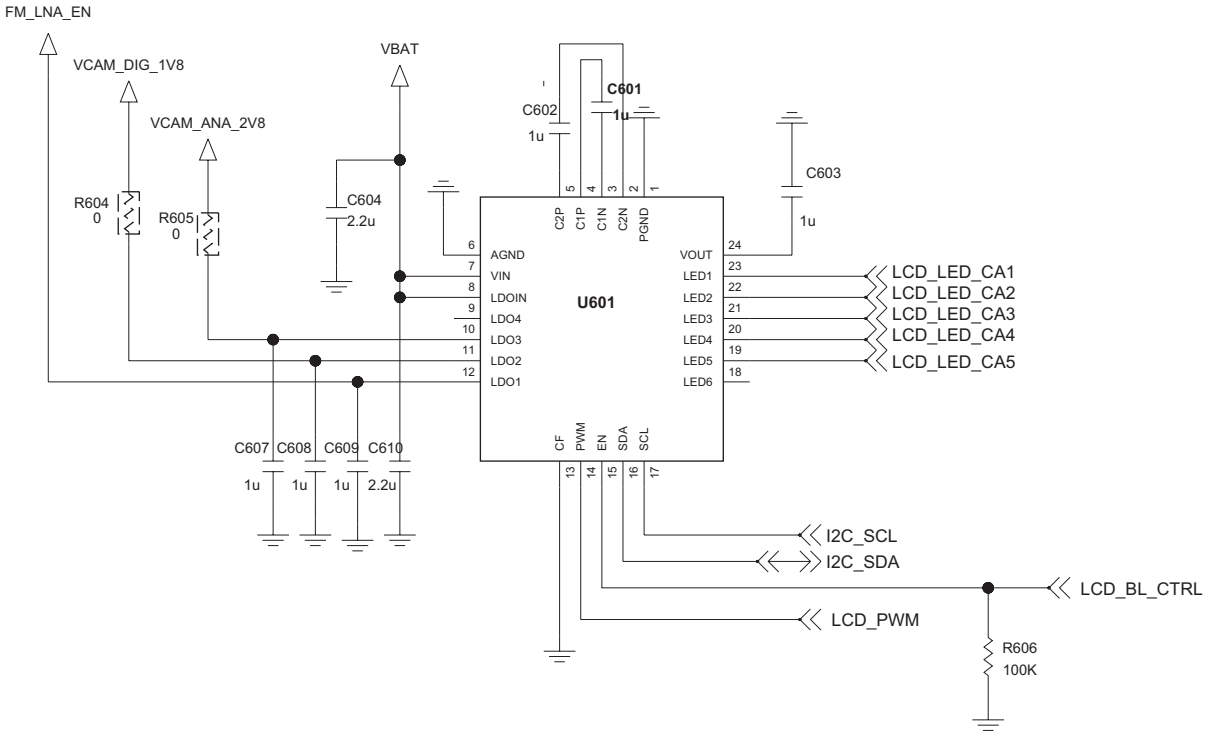


Figure 3-9-2. RT9396 CIRCUIT DIAGRAM

The RT9396 is a power management IC (PMIC) for backlighting and phone camera applications.
The PMIC contains a 6-Channel charge pump white LED driver and four low dropout linear regulators.
The charge pump drives up to 6 white LEDs with regulated constant current for uniform intensity.
Each channel (LED1 to LED6) supports up to 25mA of current. These 6-Channels can be also programmed as 4 plus 2-Channels or 5 plus 1-Channels with different current setting for auxiliary LED application.
The RT9396 maintains highest efficiency by utilizing a x1/ x1.5/ x2 fractional charge pump and low dropout current regulators. An internal 6-bit DAC is used for backlight brightness control. Users can easily configure up to 64-steps of LED current via the I2C interface control. The RT9396 also comprises low noise, low dropout regulators, which provide up to 200mA of current for each of the four channels. The four LDOs deliver 3% output accuracy and low dropout voltage of 200mV @ 200mA.
Users can easily configure LDO output voltage via the I2C interface control. The LDOs also provide current limiting and over-temperature functions. The RT9396 is available in a WQFN-24L 3x3 package.

LED Backlight Current

RT9396 communicates with a host (master) Using the standard I2C 2-wire interface.
The two bus lines of SCL and SDA must be pulled high when the bus is not in use. Internal pull-up resistors are installed. After the START condition, the I2C master sends a chip address. This address is eight bits long, consisting of seven address bits and a following data direction bit (R/W).
The RT9396 address is 10101000 (A8h) and is a receive-only (slave) device. The second word selects the register to which the data will be written. The third word contains data to write to the selected register.
Figure 2 shows the writing information for the four LDOs as well as for each LED current. In the second word, the sub-address of the four LDOs is "001" and the sub-address of the LED Driver for different dimming modes are respectively "010", "011" and "100". For the LDO output voltage setting, bits B1 to B4 represent each LDO channel respectively where a "1" indicates selected and a "0" means not selected.
The B0 bit controls on/off (1/0) mode for the selected LDO channel(s). Then, in the third word, bite C0 to C3 control a 16-step setting of LDO1 to LDO4.The voltage values are listed in Table 1. For LED dimming, there are three operating modes (Backlight I, Backlight II and Backlight III) to select from by writing respectively "010", "011" and "100" into the First three bits of the second word, It should be noticed that no matter which mode is selected, LED1 to LED3 must be turned on, else LED4 to LED6 can not be Turned on.
When Backlight I is selected, all six LEDs have the same behavior. Their 64-step dimming currents are set by bits C0 to C5, which are listed in Table 2. The bits C6 and C7 determine the fade in/out time of each step as shown in Figure 2. For Backlight II and Backlight III, two sets of LEDs, called Main and Sub, can work separately.

Backlight Quiescent Current

The quiescent current required to operate all four backlights is reduced by 1.5mA when backlight current is set to 4.0mA or less. This feature results in higher efficiency under light-load conditions. Further reduction in quiescent current will result from using fewer than four LEDs.

3.10 MiniABB (Battery Charger & MUIC) Interface

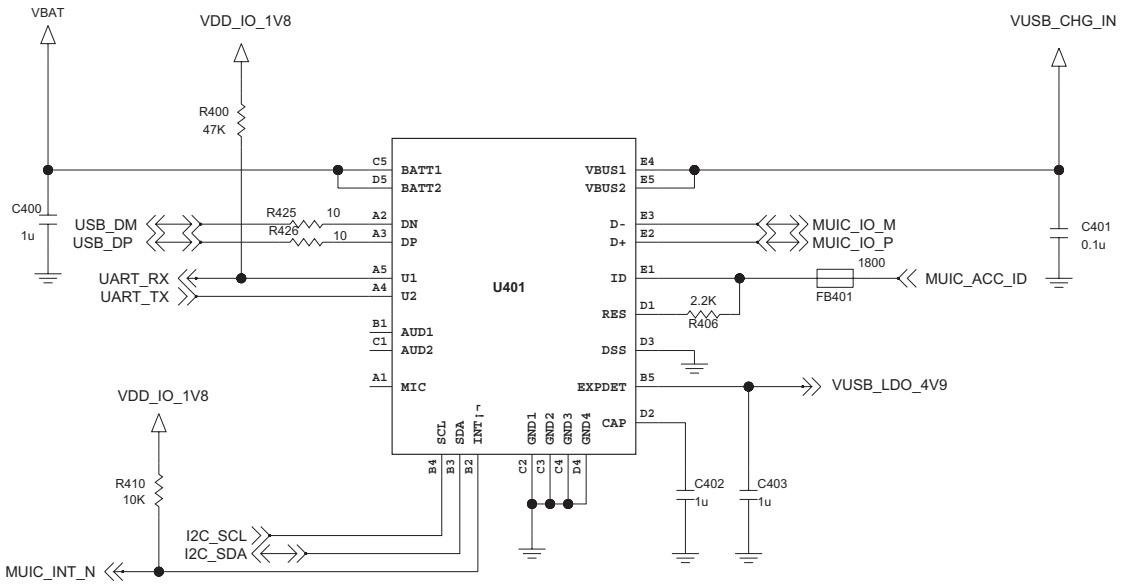


Figure 3-10-1 Mini ABB BLOCK

The LP8727 is designed to provide automatic multiplexing switches between Micro/Min USB connector and USB, UART, and Audio paths in cellular phone applications, and it also contains a single-input Li-ion battery charger and over-voltage protected LDO. Programming is handled via ans I2C compatible Serial Interface allowing control of charger, multiplexing switches, and reading status information of the device.

The multiplexing switches on USB and UART support High-Speed USB and Audio inputs can be driven to negative voltage rail. The LP8727 is compatible with USB charging specification rev 1.1 form USB IF.

The Li-ion charger requires few external components and integrates the Power FET. Charging is thermally regulated to obtain the most efficient charging rate for a given ambient temperature. It has Over-Voltage Protection (OVP) circuit at the charger input protects the PMU from input voltage up to +28V, eliminating the need for and external protection circuitry.

An Over-voltage protected LDO which can supply up to 50mA is designed for powering up low voltage USB transceiver or waking up a PMU(Power Management Unit)when an external power source(either USB VBUS or wall adapter) is connected to the USB connector.

3.11 Keypad Interface

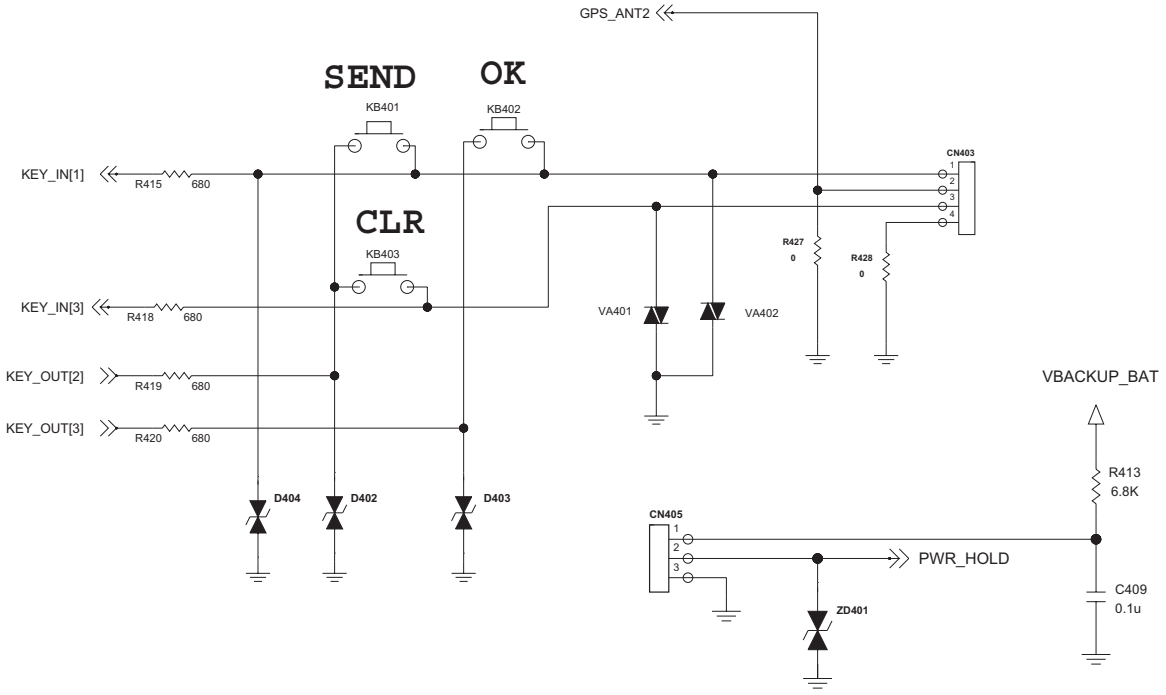


Figure 3-11-1 MAIN KEY STRUCTURE

The Keypad Interface is a peripheral controller, which can be used for scanning external keypad matrices with up to 8 rows and 8 columns (that is 64 standard keys). By adding an additional row of keys connected to ground the number of keys can be extended by up to 8 keys. This results in a maximum number of 72 keys to by identified by the Keypad Interface Controller.

The Keypad Scan Module reduces the number of interrupts and polling through the processor and therefore reduces the power consumption. The module is able to debounce and scan the external keypad matrix automatically without any software intervention. After debouncing it generates an interrupt. The interface controller contains information about the key (or key combination) that was pressed and how long it was pressed.

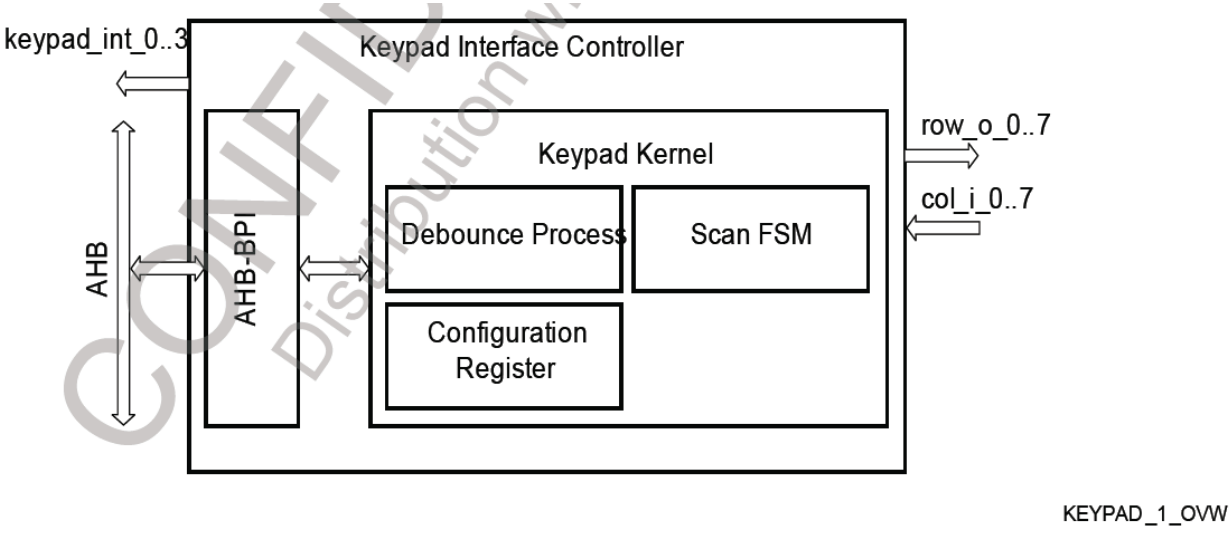


Figure 3-11-3 Block Diagram and System Integration of the KPD

3.12 Audio Interface

3.12.1 Functional Overview

The audio front-end of X-GOLD™215 offers the digital and analog circuit blocks for both receive and transmit audio operation, from a mobile phone perspective (called audio-in and audio-out subsequently). It features a high-quality, stereo digital-to-analog path with amplifier stages for connecting acoustic transducers to X-GOLD™215. In audio-in path the supply voltage generation for electret microphones, a low-noise amplifier and analog to digital conversion are integrated in X-GOLD™215. A more detailed functional description will be given in the following sections.

The audio front-end itself can be considered to be organized in three sub-blocks:

- Interface to processor cores (TEAKLite® and - indirectly - ARM)
- Digital filters
- Analog part

The following figure shows an architecture overview of the Audio section.

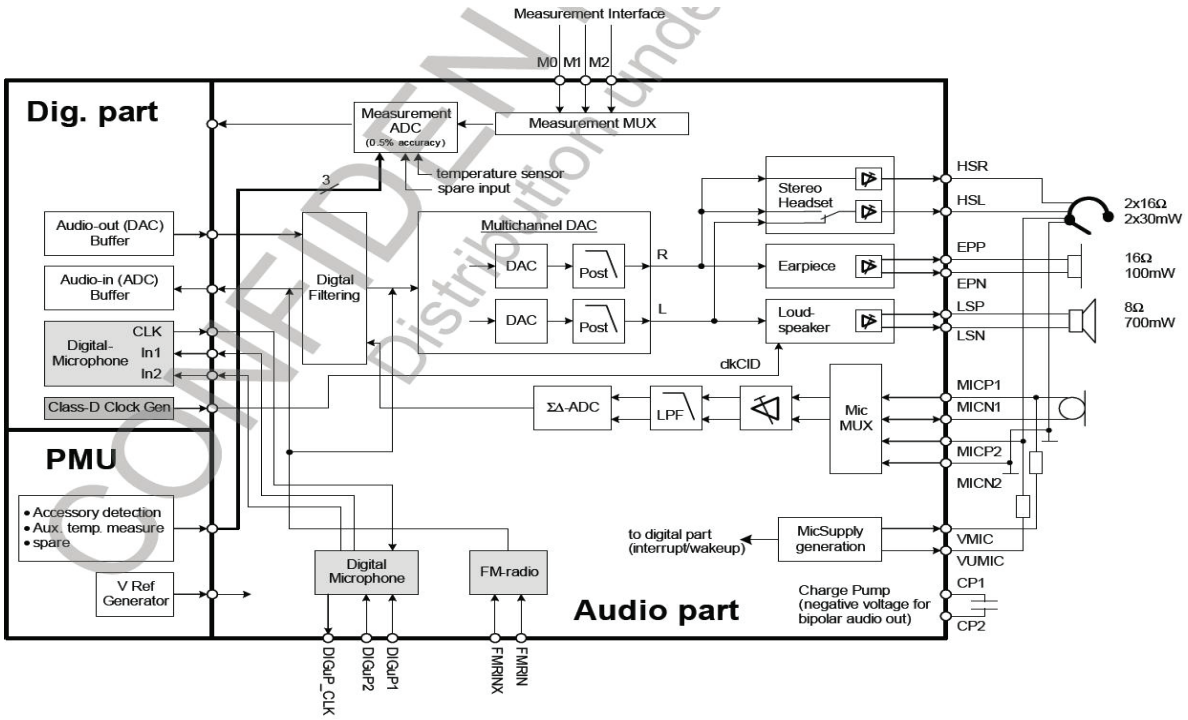


Figure 3.12.1 Audio Section Overview

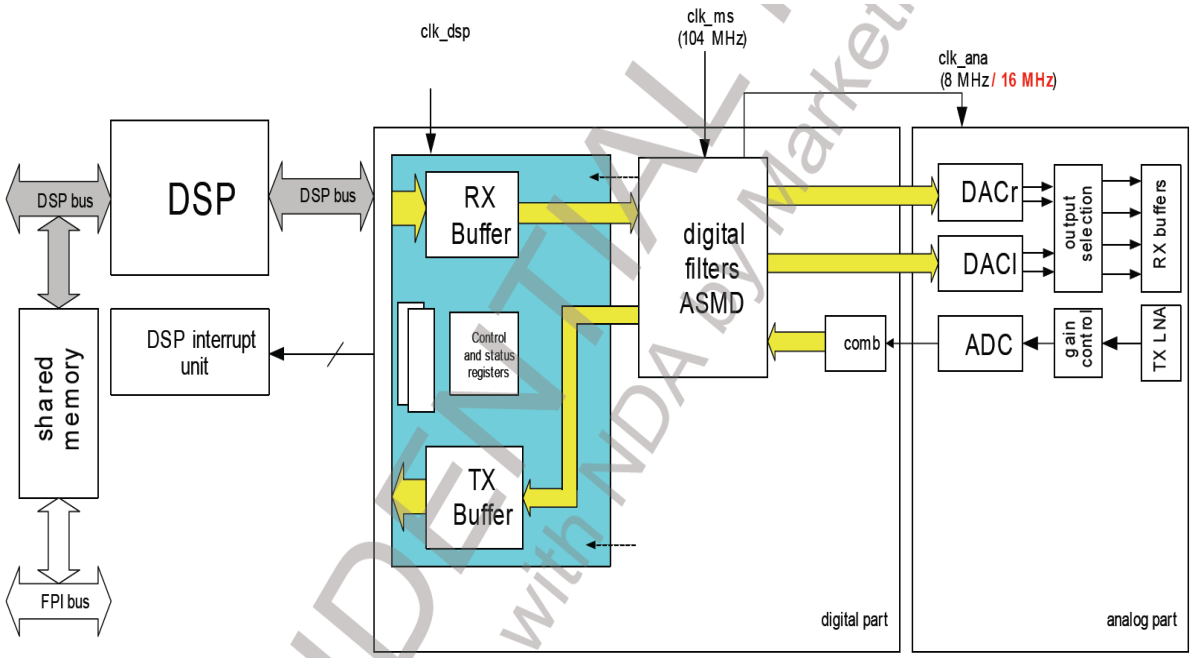


Figure 3.12.2 Overview of Clocking and Interfaces of Audio Front End

The audio front-end of X-GOLD™215 has the following major operation modes:

- Power-down: All analog parts are in power down and all clocks of the digital part are switched off.
- Audio mode: Digital decimation/interpolation filters are connected to the interface buffers and the analog part is enabled.

These major modes can be modified by certain control register settings.

- Due to the new gain settings in the TX path, the maximum input voltage is limited to 0.8 Vpp.
- In both voiceband paths, the value range for voice samples is confined to 97.5%, i.e. to [-31948, 31947] or [8334H, 7CCBH] in X-GOLD™215.
- On the TX path, 83% "1"s on the VTPDM line correspond to a 16-bit value of 7CCBH and 17% "1"s correspond to a 16-bit value of 8334H at the digital filter output. Thus the usable range is 66%. This range can be scaled to 100% by Firmware.
- The high-pass functions of the voiceband filters have to be implemented in firmware on TEAKLite®.

3.12.2 Digital Part

The digital part of the X-GOLD™215 audio front-end comprises an interface to the TEAKLite® bus, interfaces to the interrupt units of TEAKLite®, digital interpolation filters for oversampling digital-to-analog conversion, digital decimation filters for analog-to-digital conversion and an interface to the analog part of the audio front-end. For the digital microphone all the filtering is done in a dedicated hardware. The output sample stream is then fed in a duplicated ring buffer structure like the data from the analog microphone path (after A/D conversion and subsequent digital filtering).

▪ Interpolation Filter

The interpolation path of the X-GOLD™215 audio front-end increases the sampling rate of the audio samples to the rate of the digital-to-analog converter. Because the input sampling rates can vary between 8 kHz and 47.619 kHz the filter characteristic and oversampling ratio can be adjusted to the respective sampling rate. The requirements for the interpolation filters depend on the sampling rate, because a sufficient out-of-band discrimination in the audio frequency band (20 Hz,...,20 kHz) has to be ensured.

▪ Decimation Filter

The digital decimation filter on X-GOLD™215 has two operating modes: 8 kHz output sampling rate and 16 kHz output sampling rate (or 16 kHz output sample rate and 16kHz bandwidth in case of doubled ASMD clock).

3.12.3 Analog Part

The analog part of the X-GOLD™215 audio front-end in audio-out direction consists of a stereo digital to analog converter (multi-bit oversampling converter) which transforms the output of the digital interpolation filter into analog signals. It is followed by the gain control/amplifier section. The DAC outputs can be switched to several output buffers. In audio-in section there is an input multiplexer which selects either one of two differential microphone inputs to be connected to the low-noise amplifier and analog pre-filter. The signals from the analog pre-filter are input to a second-order sigma-delta analog-to-digital converter. In addition there is a connection for FM-radio playing.

▪ Audio-out Part

The analog audio-out part consists of two multi-bit digital-to-analogue converters (DAC) and an output stage. The signal sources are switched to the output drivers in the output stage. The output drivers consist of: a) one mono, differential class-D Loudspeaker driver, b) one mono, differential Earpiece driver and c) one stereo, single-ended (with uni- or bipolar signals), Headset driver.

▪ **Digital-to-analog converters**

The multi-bit oversampling DACs of the X-GOLD™215 audio front-end convert the 16-bit data words coming from the digital interpolation filters to analogue signals.

▪ **Output Amplifier**

The different output buffers in X-GOLD™215 are driven by the outputs of the selection block. The differential earpiece driver can be used to drive a 16 Ω earpiece and works in differential. The two single ended headset drivers can be used to drive a 16 Ω headset. They can work unipolar mode, where an AC coupling of the headset might be needed, or can work also in bipolor mode. The differential loudspeaker driver can be used to drive a 8 Ω loudspeaker. As it is a class-D amplifier the needed suppression of the higher harmonics of the switching signals has to be achieved by the external circuitry. The buffers are designed to be short circuit protected.

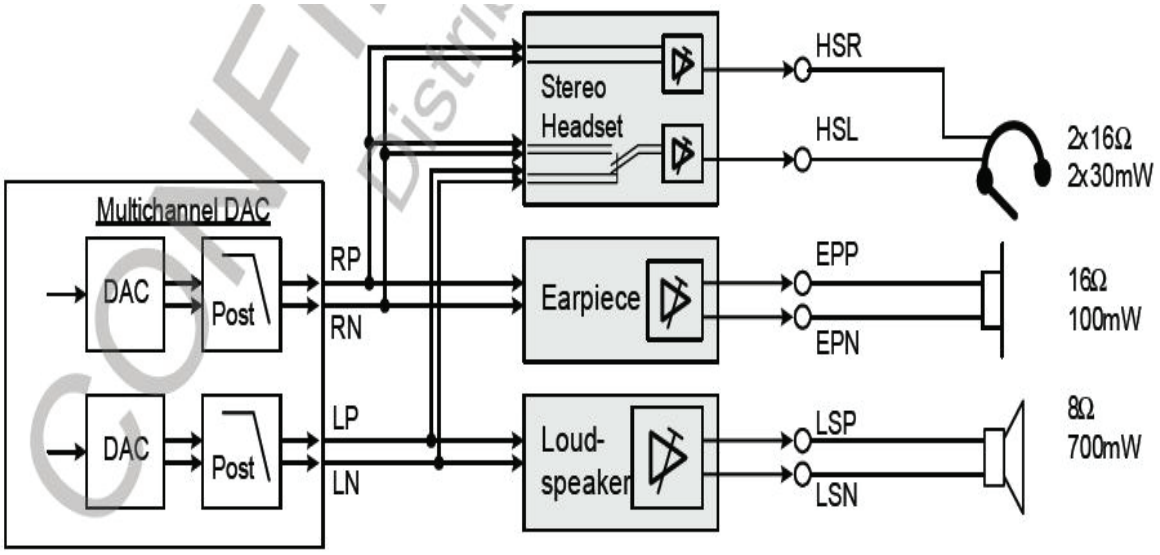


Figure 3.12.3 Switching for R/L DACs onto Buffers

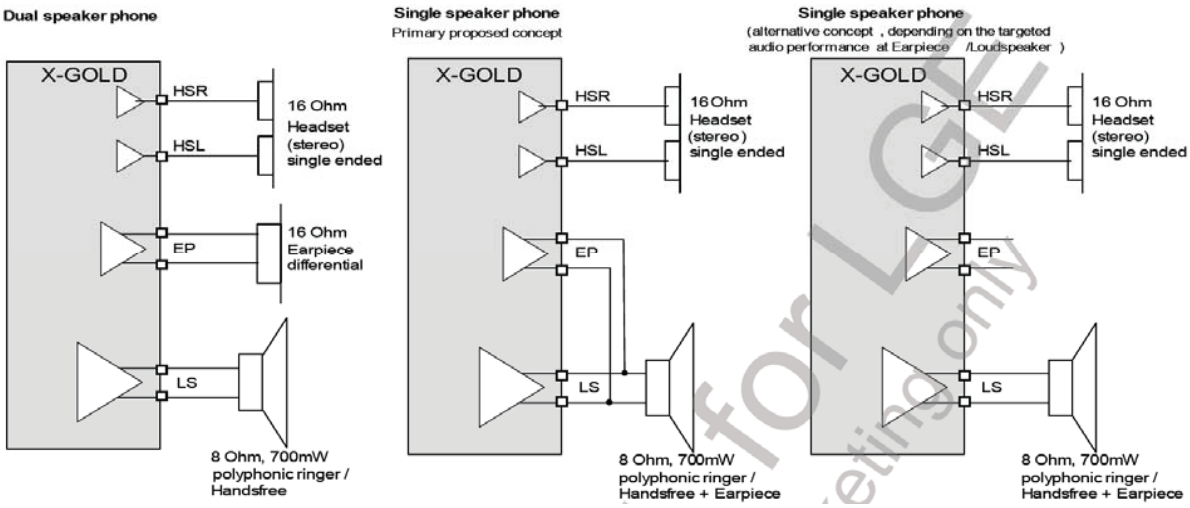


Figure 3.12.4 Different Application Scenarios

In order to achieve the single-speaker concept by parallel connection of Earpiece and Headset amplifier the Earpiece amplifier have to sustain the up to 5 V voltage of the class-D amplifier.

▪ Audio-in Path

The audio-in path of X-GOLD™215 provides two differential microphone input sources, MIC1and MIC2.

- The inputs for microphone MIC1 are MICP1 and MICN1.
- The inputs for microphone MIC2 are MICP2 and MICN2.

The audio-in path consists of an input selector, a low noise amplifier and following pre-filter with gain control, a second order ΣΔ-converter and a digital decimation filter. It supports both standard GSM (bandwidth 3.5 kHz) and wideband (bandwidth 7 kHz) speech bands.

The differential input signal from the microphone first passes a low noise amplifier and following pre-filter and an anti-aliasing pre-filtering stage achieving and overall variable gain ranging from 0 dB to +39 dB . The signal is then modulated by a second order ΣΔ-converter which is clocked with the same clock rate as the digital to analog converters. The ΣΔ-converter delivers a 1-bit pulse density modulated data stream at a rate of 2 MHz to the digital decimation filter which reduces the rate to 8 kHz or 16 kHz, depending on the current mode.

To improve SNR the sample frequency can be doubled in dedicated modes and the modulated data stream is 4MHz instead of 2 MHz.

▪ Microphone Supply

X-GOLD™215 has a single ended power-supply concept for electret microphones:
For both modes a minimal load capacitance of t.b.d. nF is necessary to guarantee stable operation of the buffer.
The maximal load capacitance must not exceed t.b.d. nF.
2 microphone supplies VMIC and VUMIC are available. The supply VUMIC has a ultra-low-power mode, where the current consumption is minimum, whilst at the same time the noise performance is reduced.
For this purpose the VUMIC is directly supplied out of the VMIC regulator, the Mic-Buffer can be switched off and only the quiescent current of the VMIC regulator is present.
This mode can be used to supply a headset and allow accessory detection with highly reduced current consumption For normal operation the supply can be switched to normal operation mode with improved noise performance. In case of an digital microphone VMIC can be used for supplying this microphone.

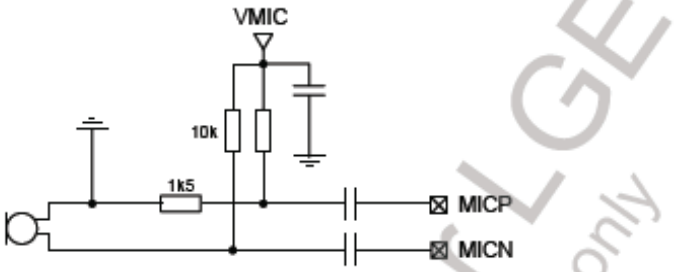


Figure 3.12.5 Typical Microphone Supply Generation (alternative)

3.13 Camera Interface(2M Fixed Focus Camera)

3.13.1 XMM215 Camera Interface

The Camera Interface (CIF) represents a complete video and still picture input interface (see Figure 26).
The CIF contains image processing, scaling, and compression functions. The integrated image processing unit supports image sensors with integrated YC_bC_r processing.
Scaling is used for downsizing the sensor data for either displaying them on the LCD, or for generating data streams for MPEG-4 compression. In general, YC_bC_r 4:2:2 JPEG compressed images should use the full sensor resolution, but they can also be downscaled to a lower resolution for smaller JPEG files. Scaling also can be used for digital zoom effects, because the scalers are capable of up-scaling as well.
CIF
All data is transmitted via the memory interface to an AHB bus system using a bus master interface.
Programming is done by register read/write transactions using an AHB slave interface.

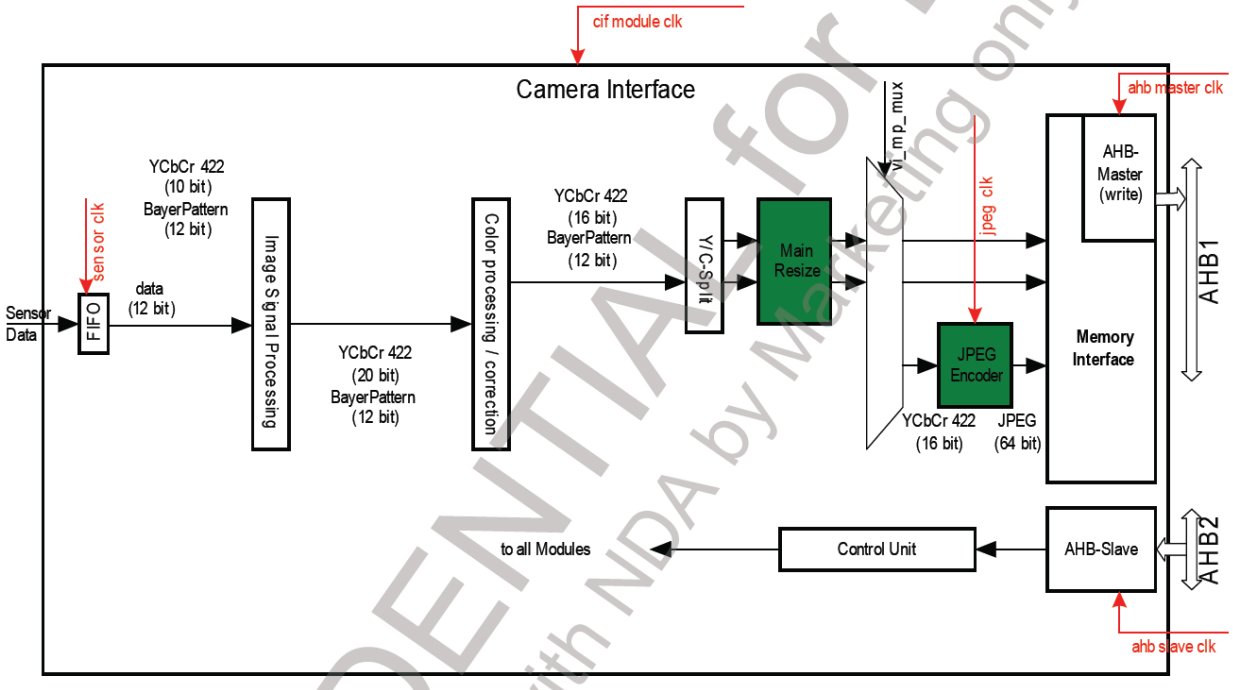


Figure 3.13.1 Block Diagram of Camera Interface

Functional Overview of CIF

The following list gives an overview over the CIF's functionality:

• 78 MHz system clock
• 78 MHz sensor clock
• 78 MHz JPEG encoder clock
• 32-bit AHB slave programming interface
• ITU-R BT 601 compliant video interface supporting YC_bC_r
• ITU-R BT 656 compliant video interface supporting YC_bC_r data
• 8-bit camera interface
• 12-bit resolution per color component internally
• YC_bC_r 4:2:2 processing
• Hardware JPEG encoder incl. JFIF1.02 stream generator and programmable quantization and Huffman tables
• Windowing and frame synchronization
• Continuous resize support
• Frame skip support for video (e.g. MPEG-4) encoding
• Macro block line, frame end, capture error, data loss interrupts and sync. (h_start, v_start) interrupts
• Programmable polarity for synchronization signals
• Luminance/chrominance and chrominance blue/red swapping for YUV input signals
• Maximum input resolution of 3 Mpixels (2048x1536 pixels)
• Main scaler with pixel-accurate up- and down-scaling to any resolution between 3 MP (2048x1536) and 32x16
• pixel in processing mode
• Buffer in system memory organized as ring-buffer
• Buffer overflow protection for raw data and JPEG files
• Asynchronous reset input, software reset for the entire IP and separate software resets for all sub-modules
• Interconnect test support
• Semi planar storage format
• Color processing (contrast, saturation, brightness, hue)
• Power management by software controlled clock disabling of currently not needed sub-modules

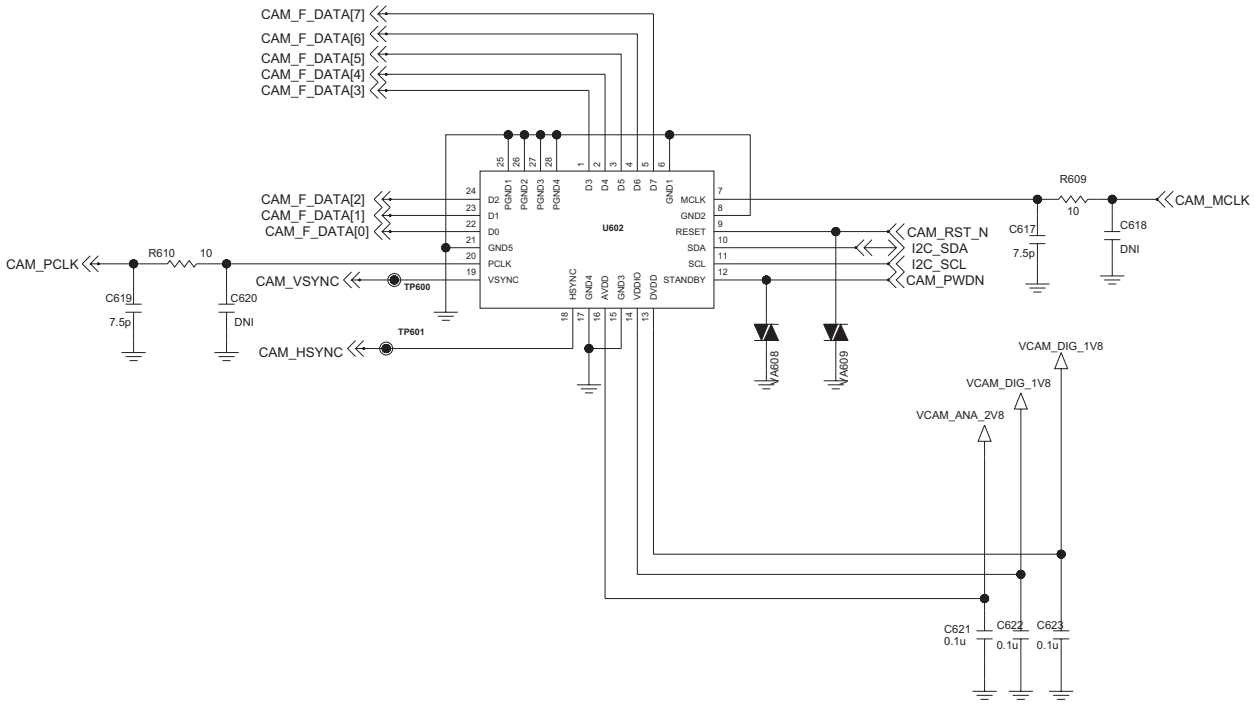


Figure 3-14 Camera circuit

3.14 Touch Interface

The touch controller is an analog interface circuit for a human interface touch screen device.
All of touch functions are composed of a register-based architecture and are controlled through the internal register sets by serial interface.

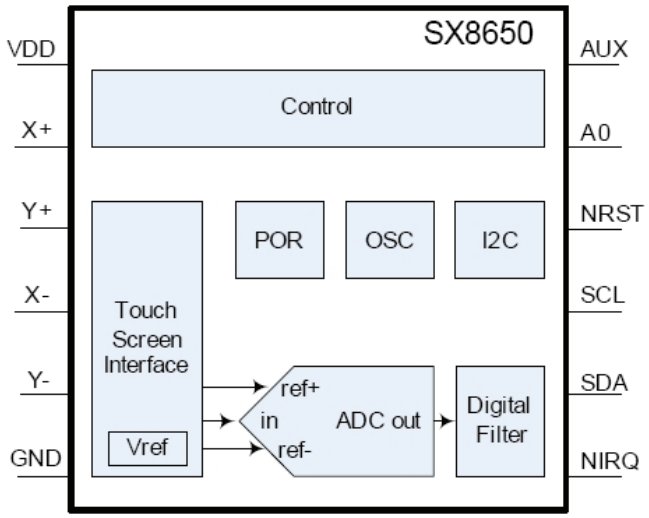


Figure 3-14 Touch Driver Block Diagram

The SX8650 is designed for 4-wire resistive touch screen applications. The touch screen or touch panel is the resistive sensor and can be activated by either a finger or stylus. The touch screen coordinates and touch pressure are converted into I2C format by the SX8650 for transfer to the host.
The SX8650's channel pins (X+, X-, Y+, Y-) directly connect to standard touch screen X and Y resistive layers. The SX8650 separately biases each of these layers and converts the resistive values into (X,Y) coordinates. The channel pins are protected to VDD and GROUND.

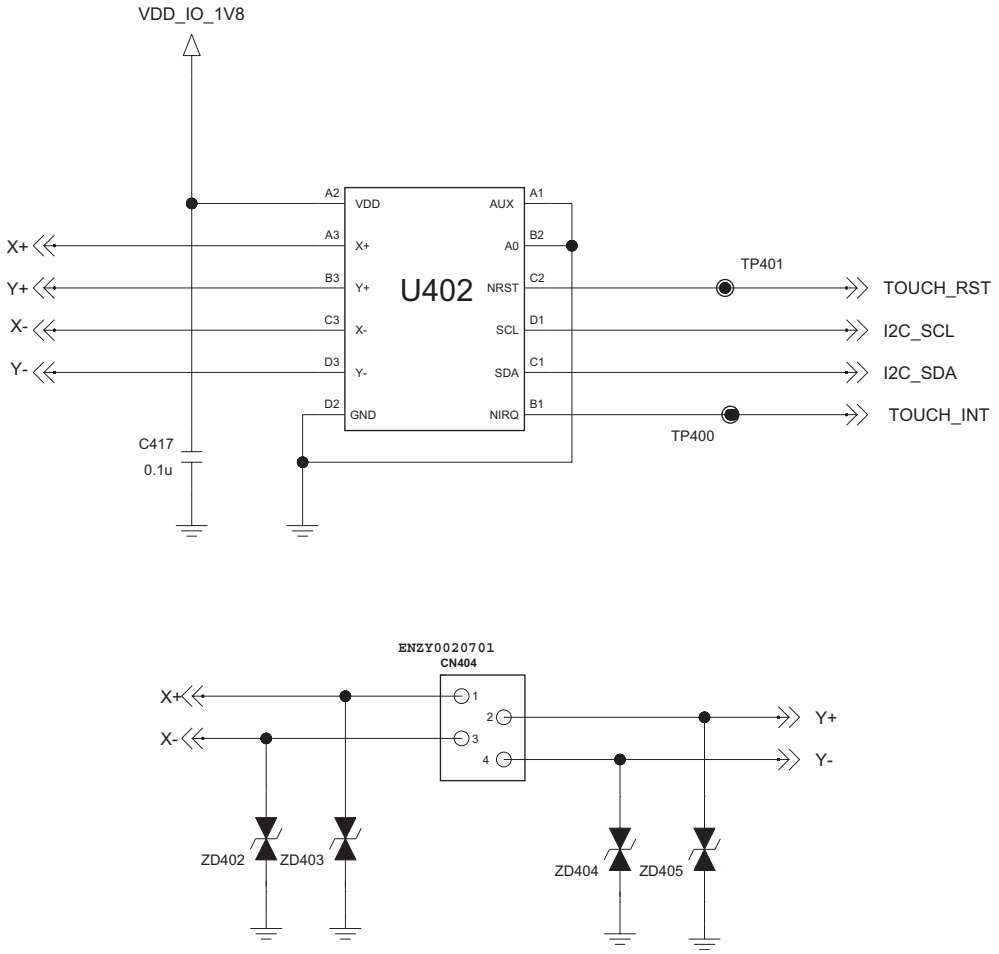


Figure 3-15-2 Touch Driver Block

4. TROUBLE SHOOTING

4.1 RF Component

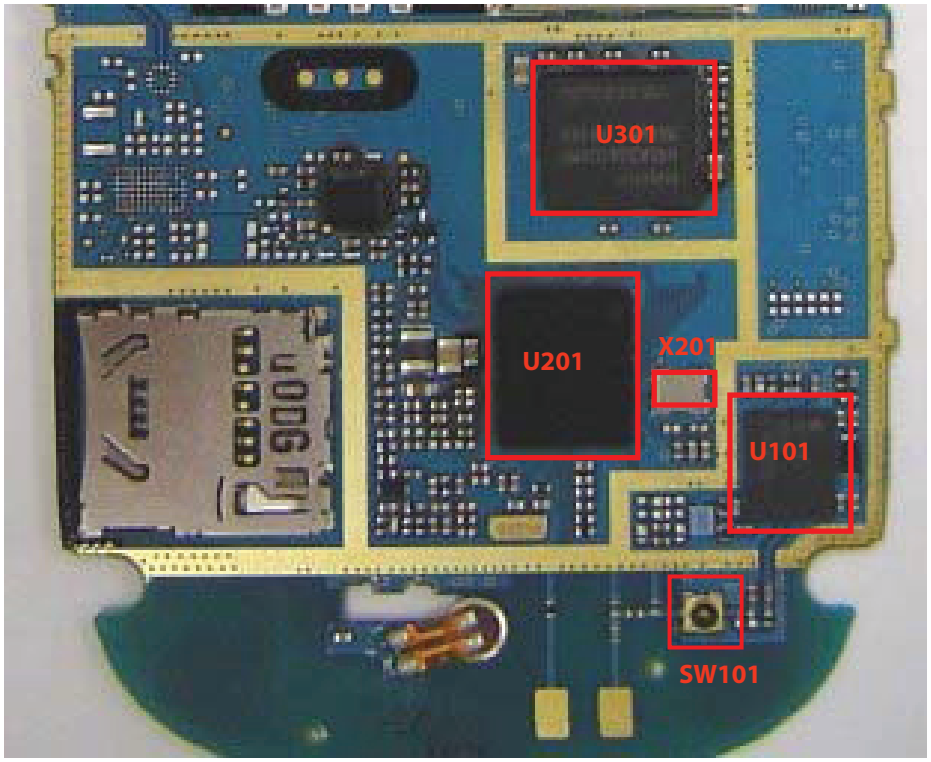
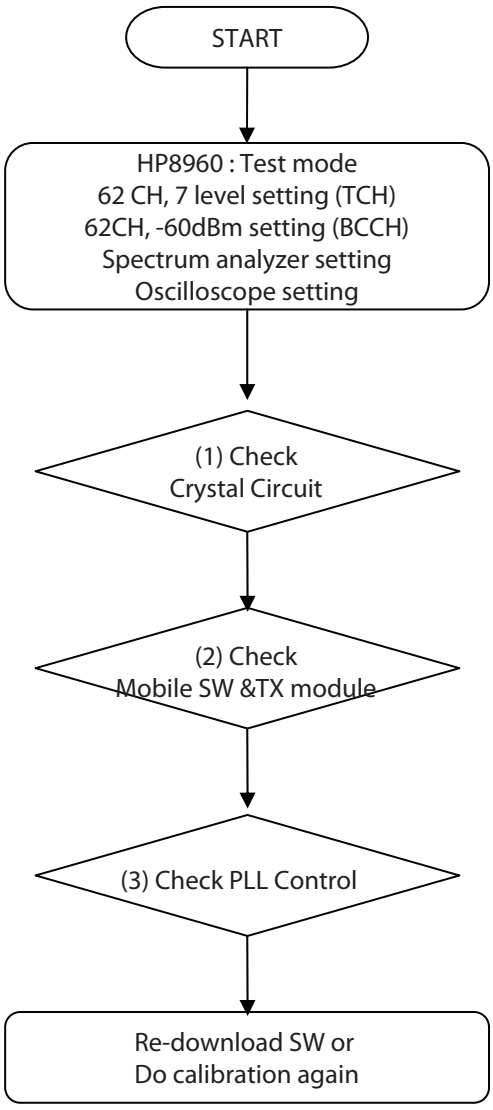


Figure 4.1

U301	Memory(2G NAND/1G SDRAM) H9DA2GH1GHMMMR-46M
U201	Main Chip (A-GOLD RADIO NAND) PMB8815
U101	GPRS QUAD TX DUAL RX MODULE RF7171
X201	Crystal, 26MHz Clock TSX- 3225
SW101	RF Switch MS-156C

4.2 RX Trouble

CHECKING FLOW



(1) Checking Crystal Circuit

TEST POINT

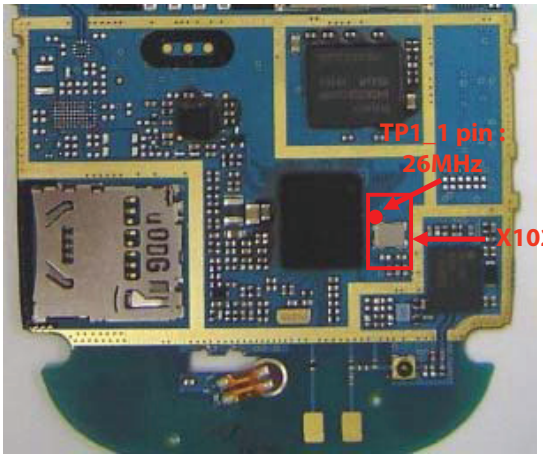
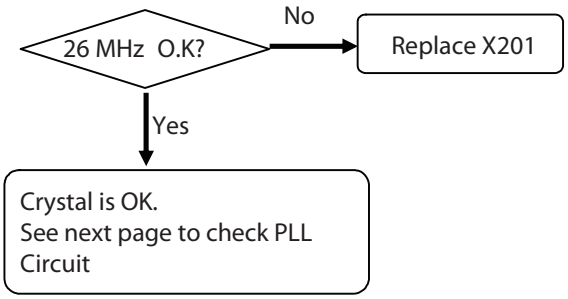


Figure 4.2.1

CHECKING FLOW



CIRCUIT

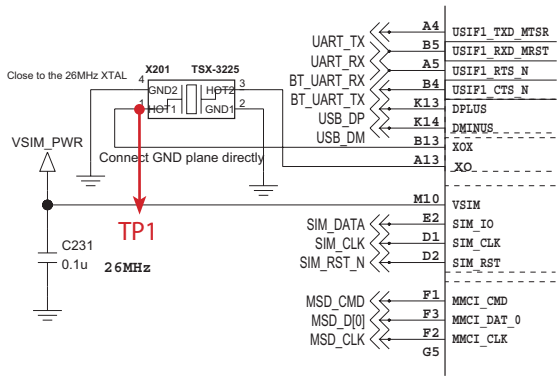


Figure 4.2.2

WAVEFORM

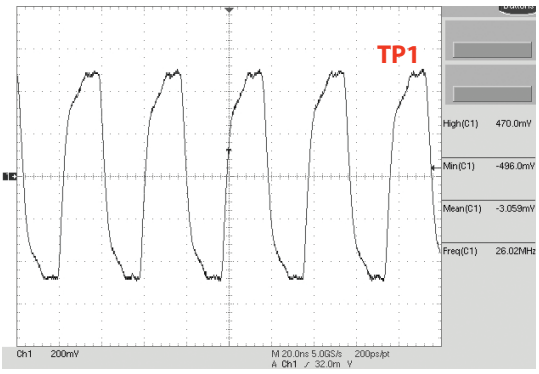


Figure 4.2.3

(2) Checking Mobile SW &TX Module

TEST POINT

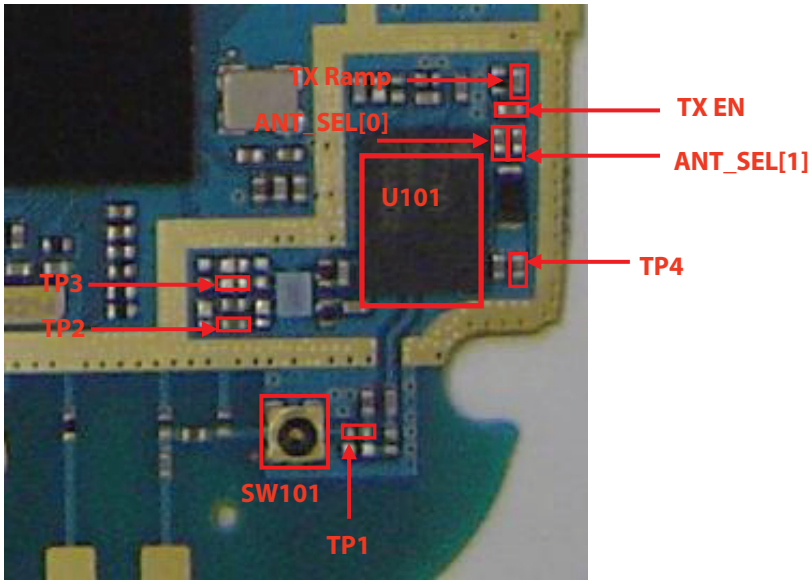
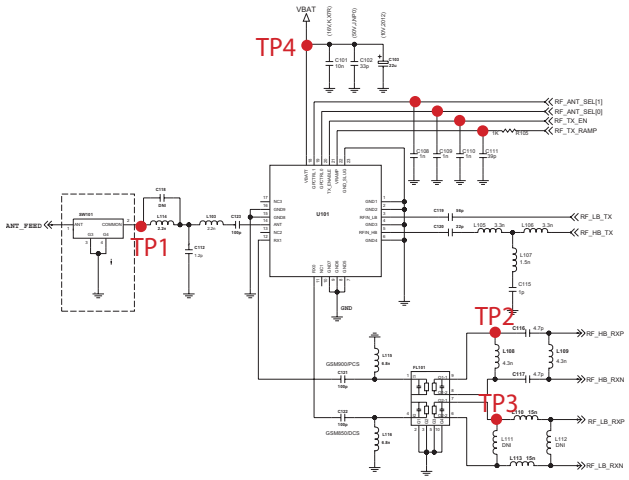


Figure 4.2.4

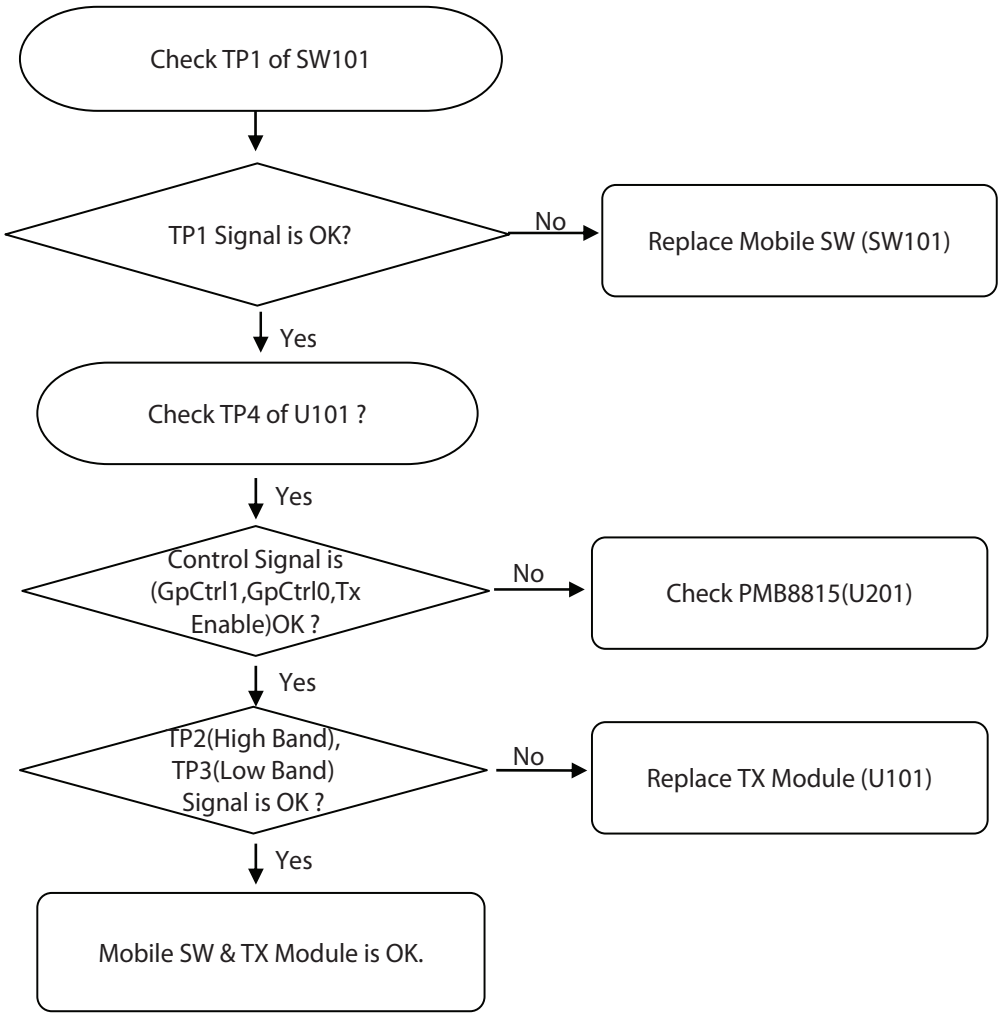
CIRCUIT



WAVEFORM

EGSM Rx

CHECKING FLOW

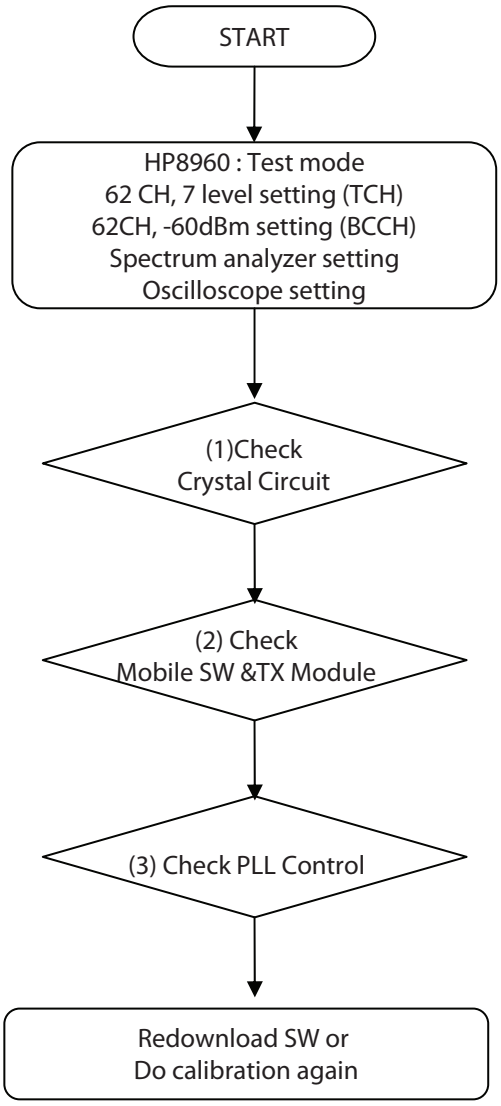


EGSM Rx

MODE	GpCtrl1	GpCtrl0	Tx Enable
STANDBY	LOW	LOW	LOW
RX0	HIGH	LOW	LOW
RX1	HIGH	HIGH	LOW
850/900 TX	HIGH	LOW	HIGH
DCS/PCS TX	HIGH	HIGH	HIGH

4.3 TX Trouble

CHECKING FLOW



(1) Checking Crystal Circuit

TEST POINT

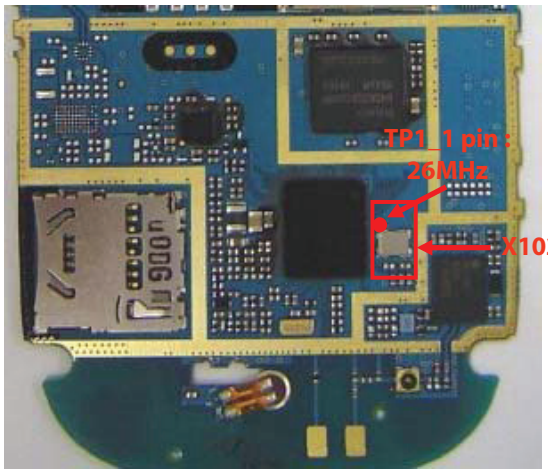
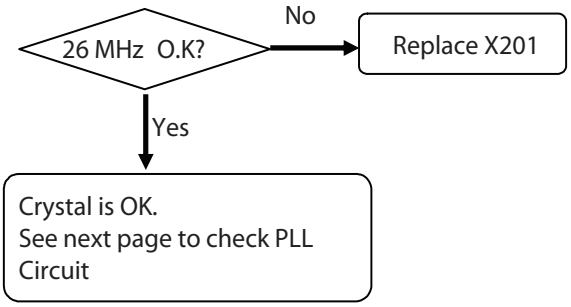


Figure 4.2.1

CHECKING FLOW



CIRCUIT

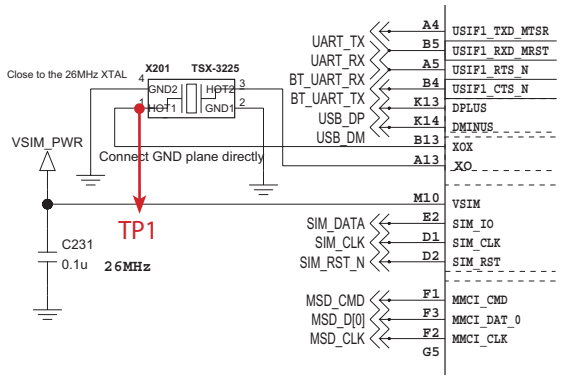


Figure 4.2.2

WAVEFORM

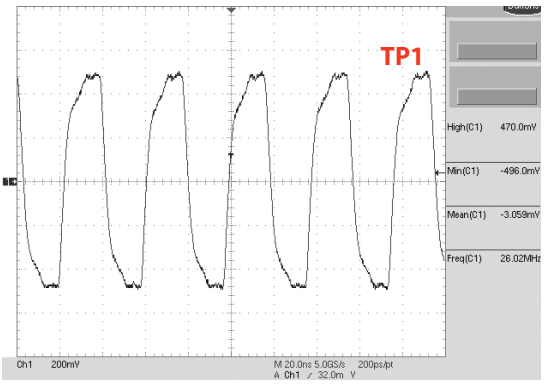


Figure 4.2.3

(2) Checking Mobile SW &TX Module

TEST POINT

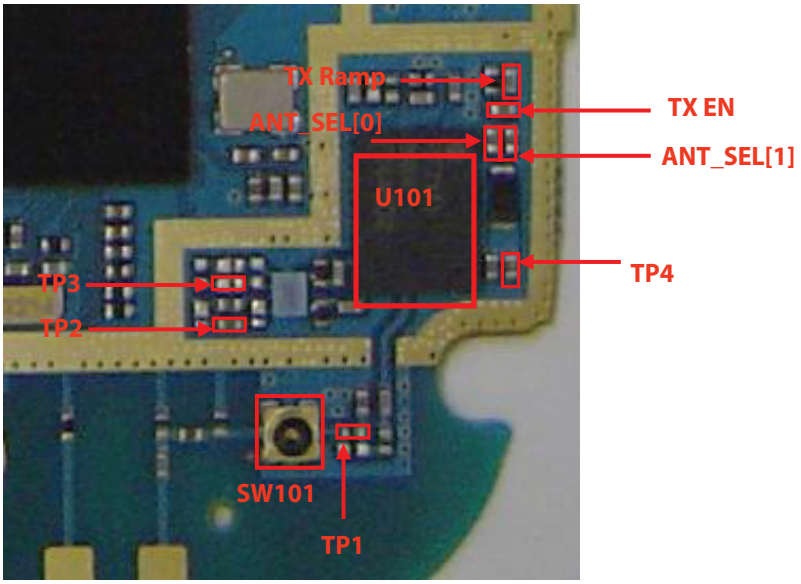
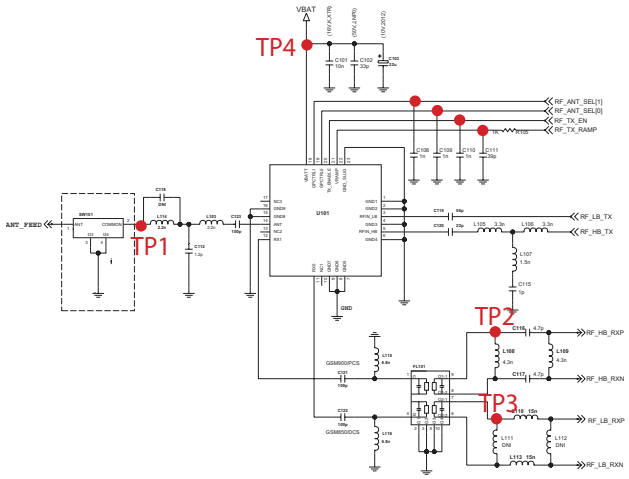


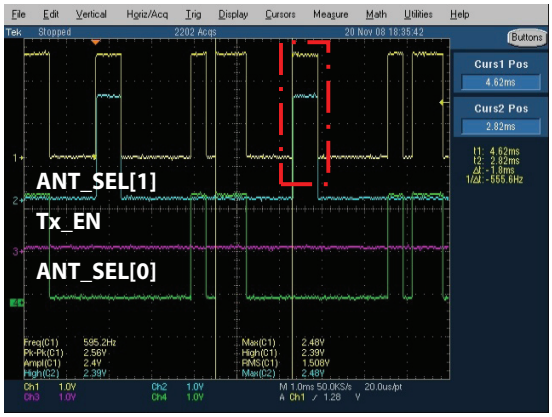
Figure 4.2.4

CIRCUIT

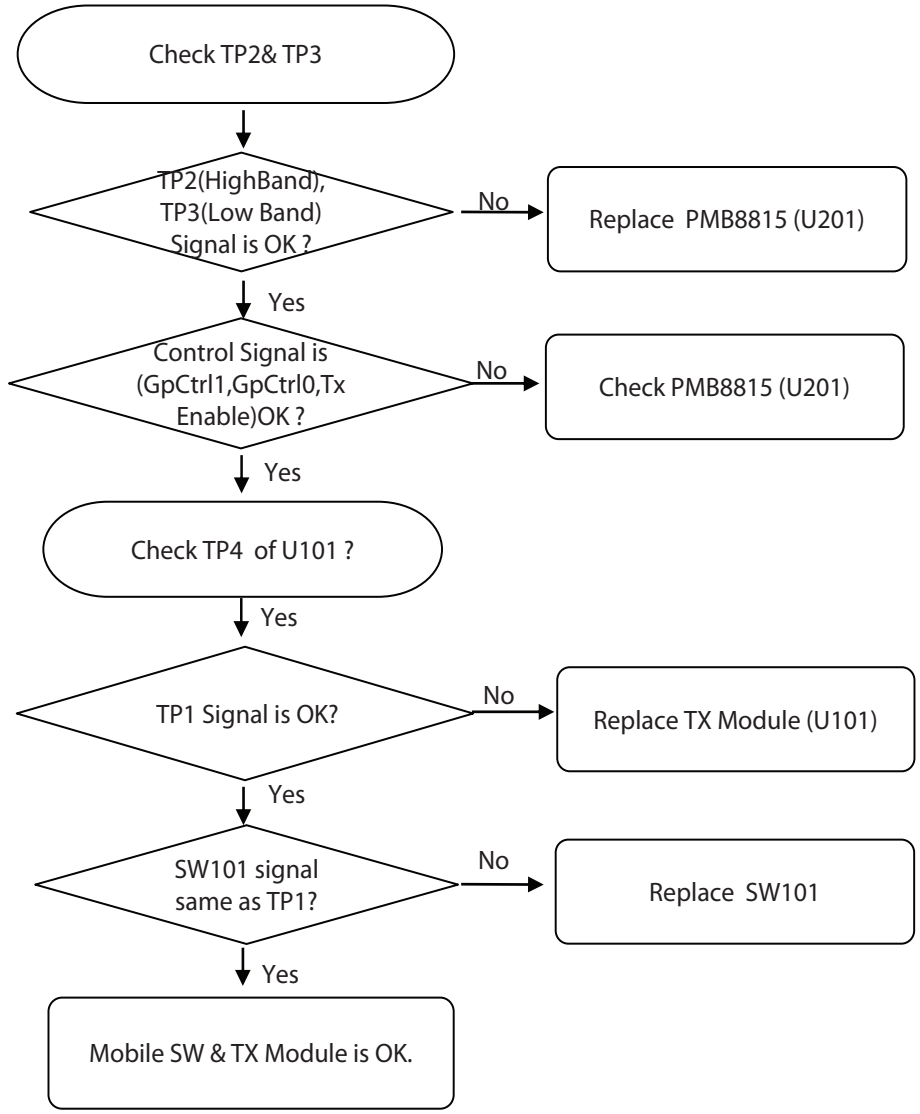


WAVEFORM

EGSM Tx



CHECKING FLOW



EGSM Tx

MODE	GpCtrl1	GpCtrl0	Tx Enable
STANDBY	LOW	LOW	LOW
RX0	HIGH	LOW	LOW
RX1	HIGH	HIGH	LOW
850/900 TX	HIGH	LOW	HIGH
DCS/PCS TX	HIGH	HIGH	HIGH

4.4 Power On Trouble

TEST POINT

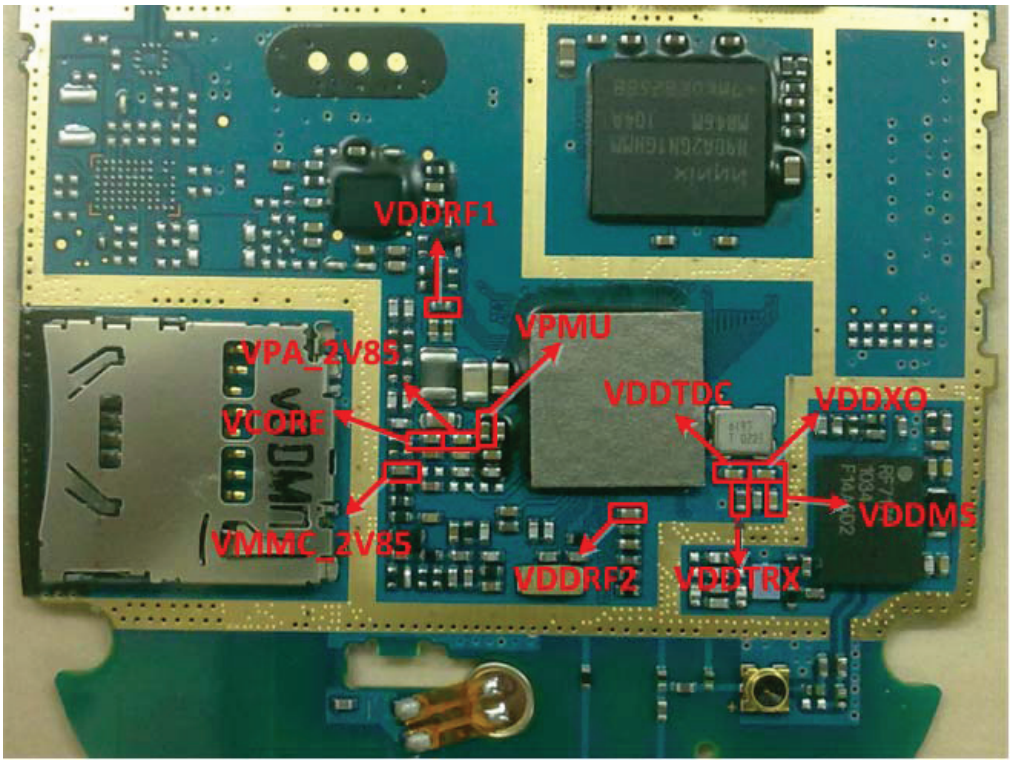


Figure 4.1

CIRCUIT

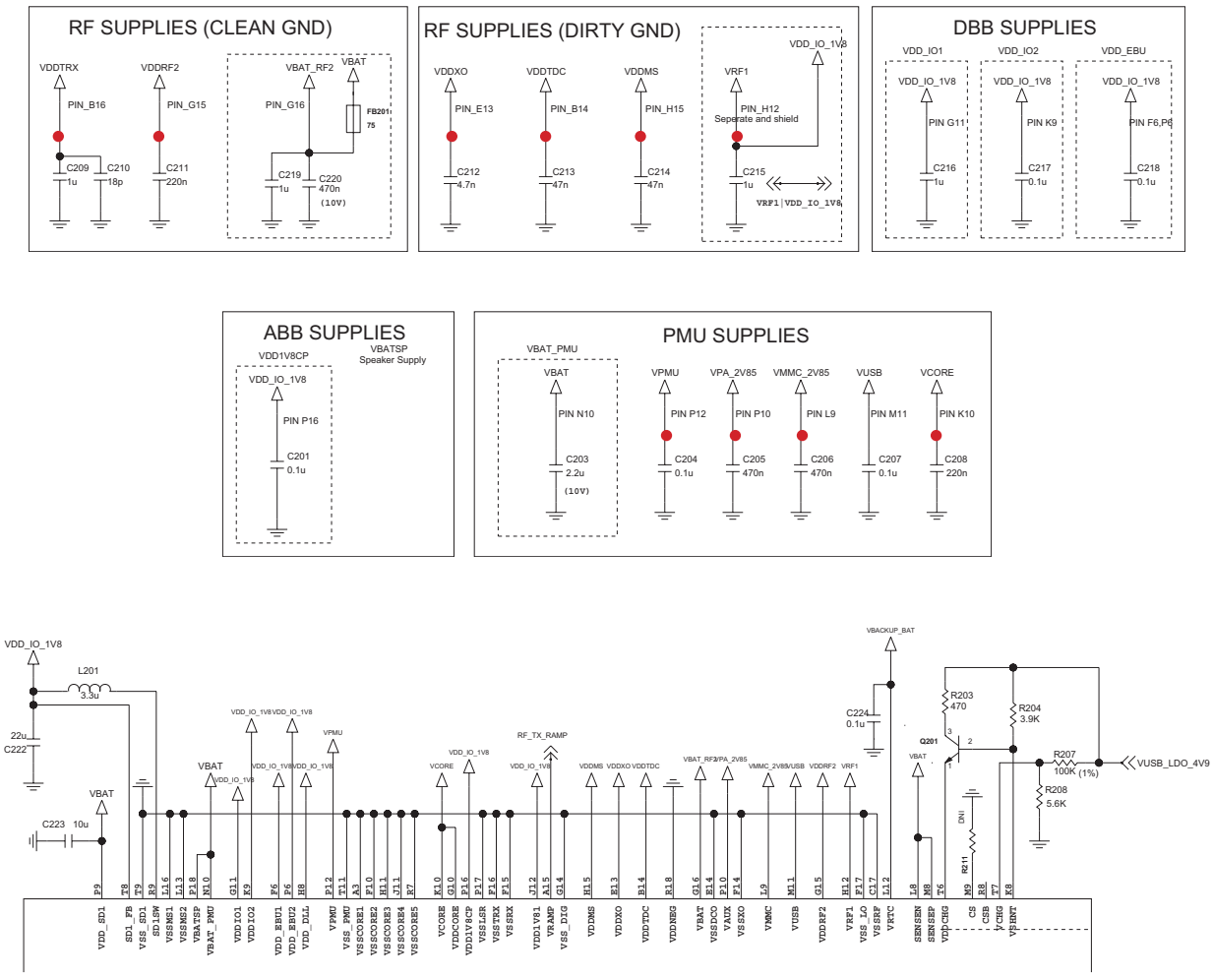
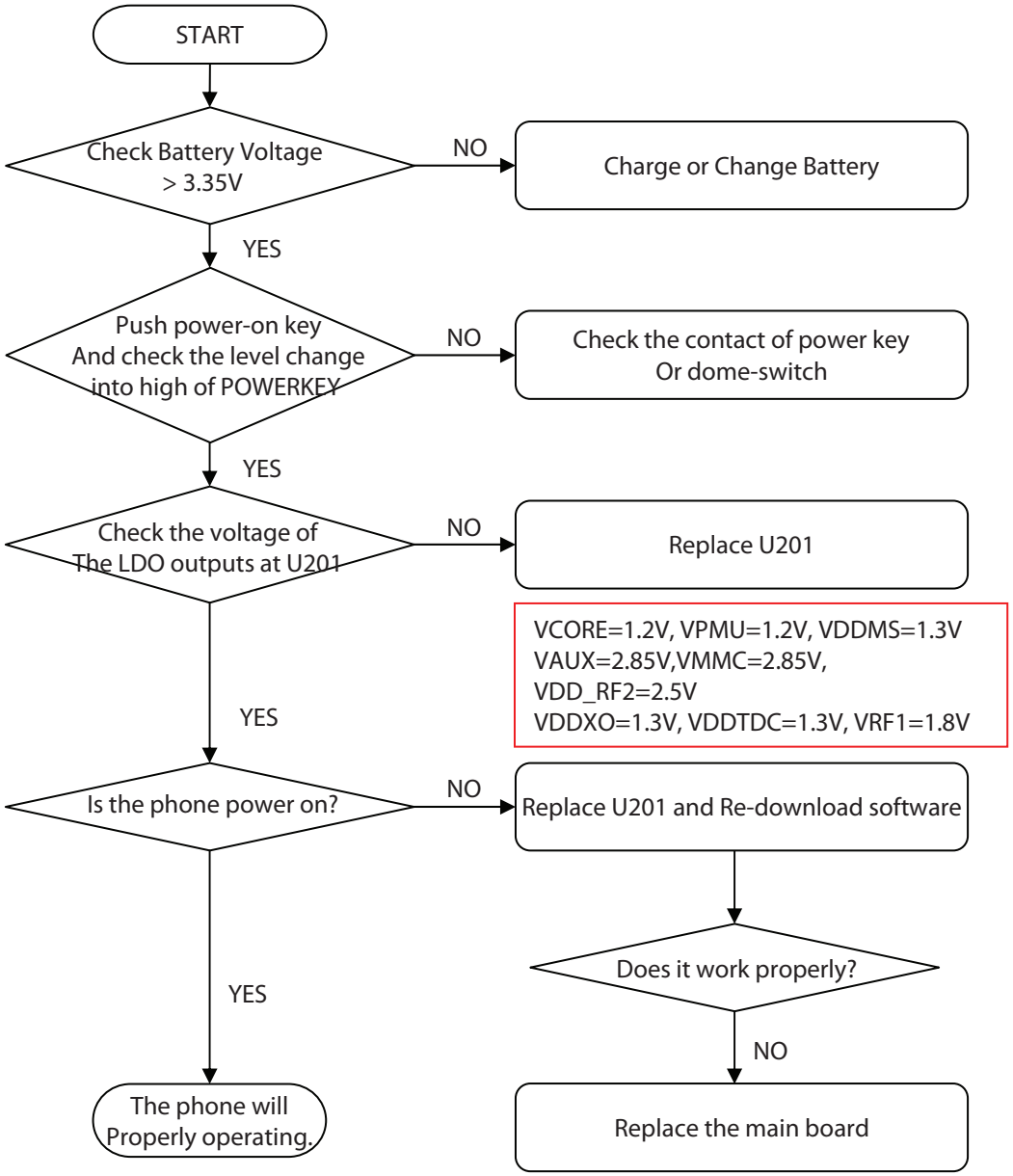


Figure 4.2 Power block of T500

CHECKING FLOW



4.5 Charging Trouble

TEST POINT

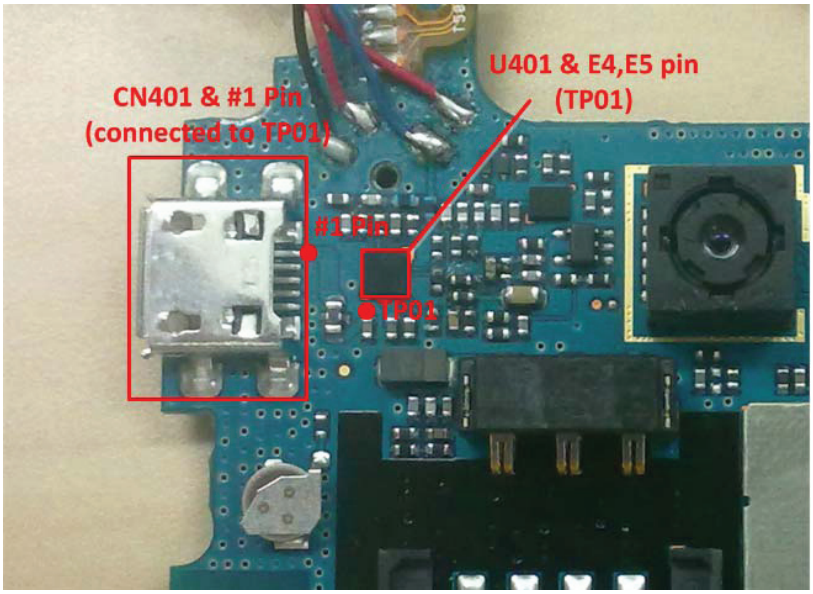
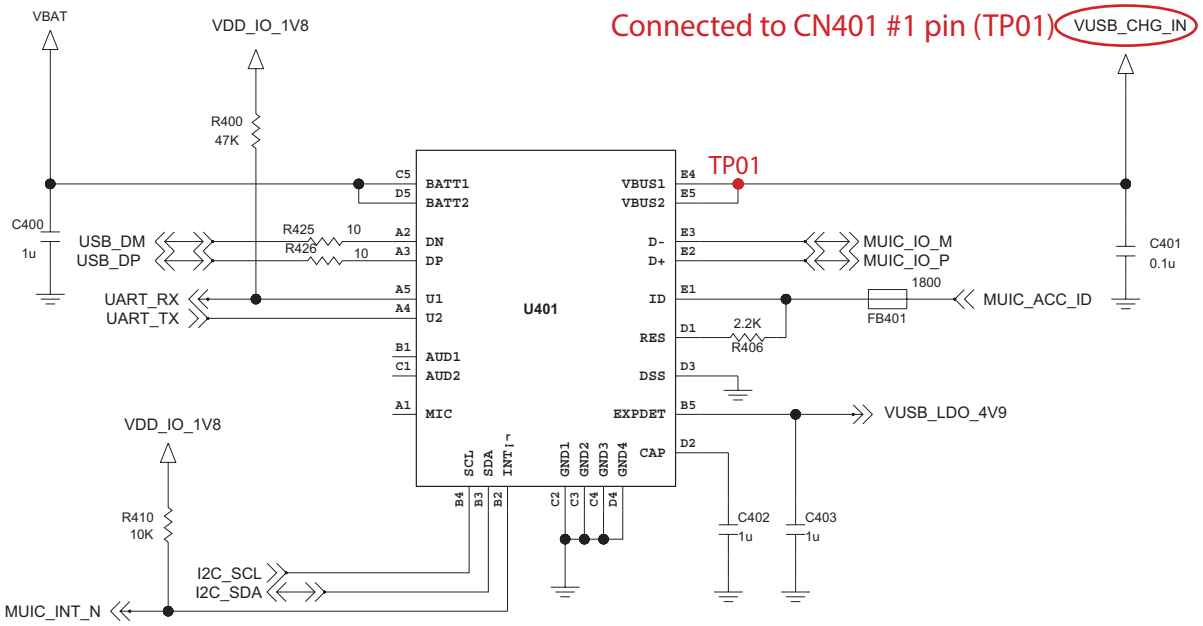
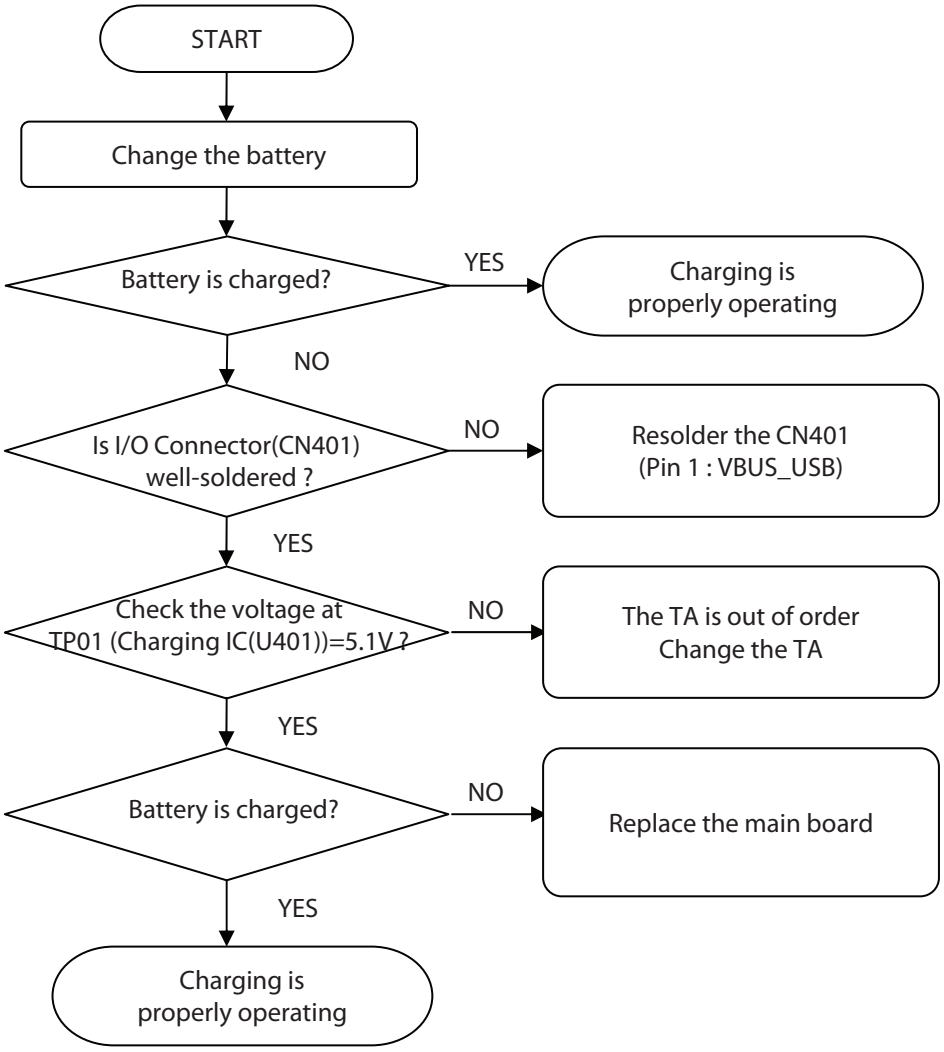


Figure 4.5

CIRCUIT



CHECKING FLOW



4.6 Vibrator Trouble

TEST POINT

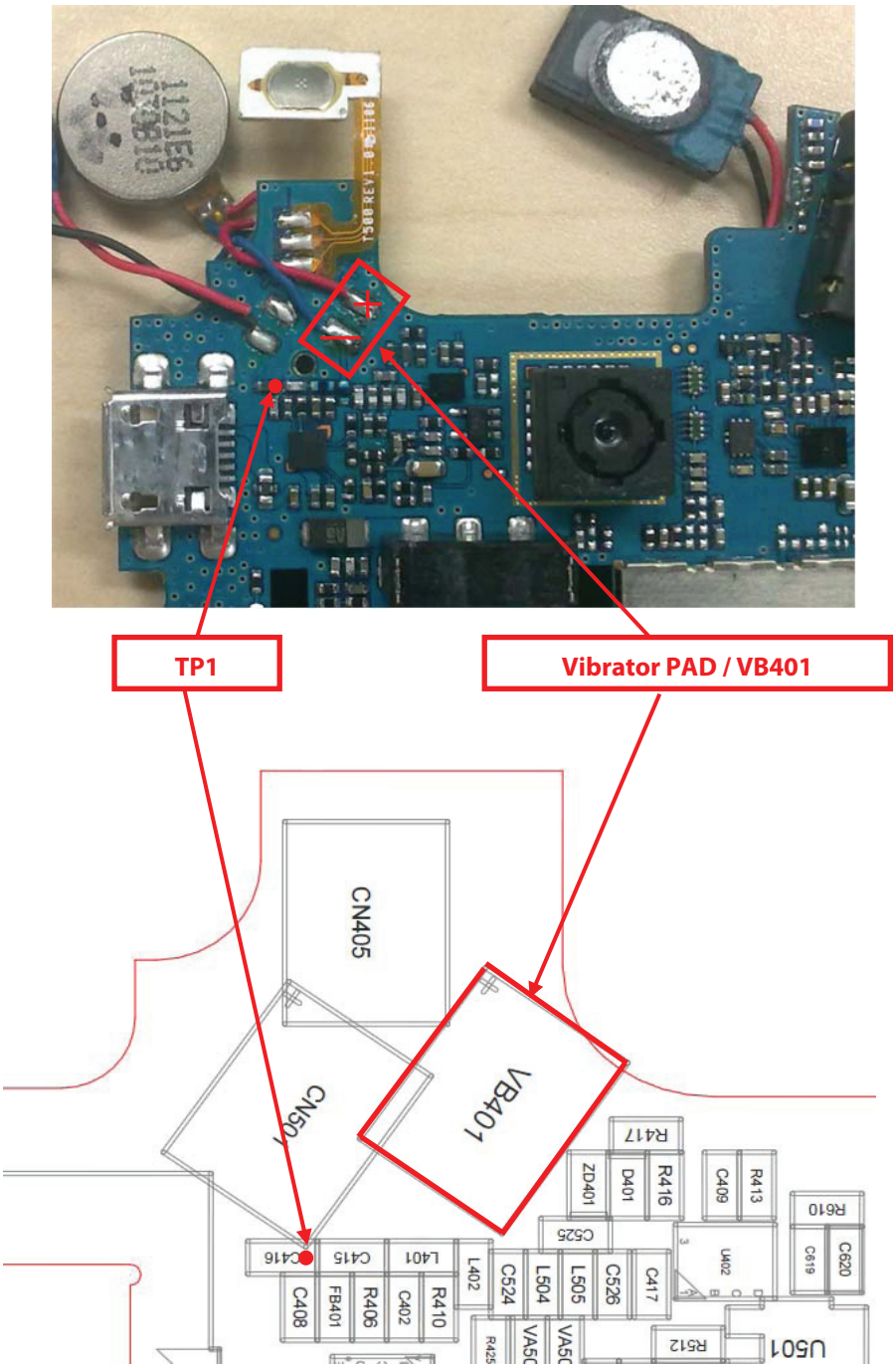


Figure 4.6

CIRCUIT

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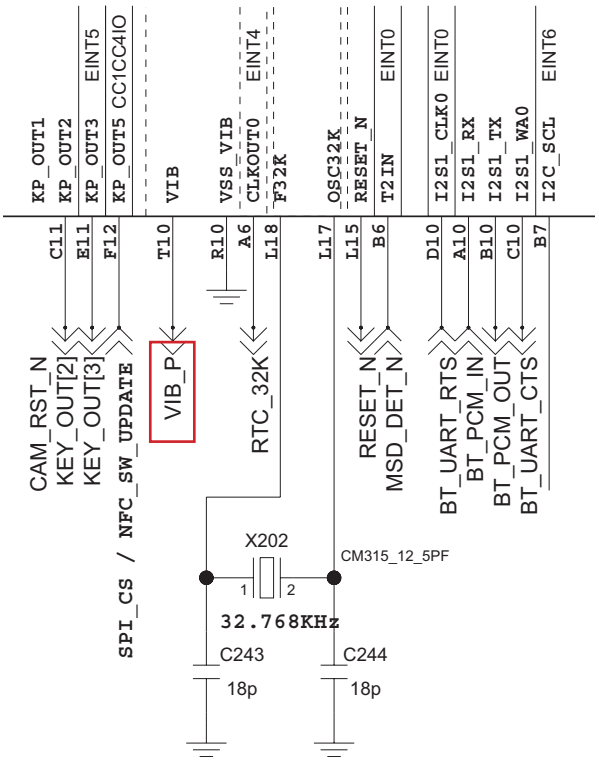
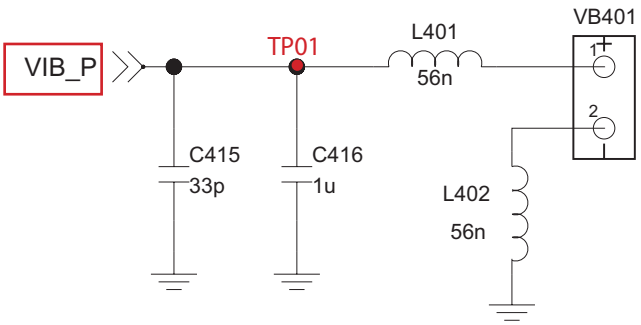
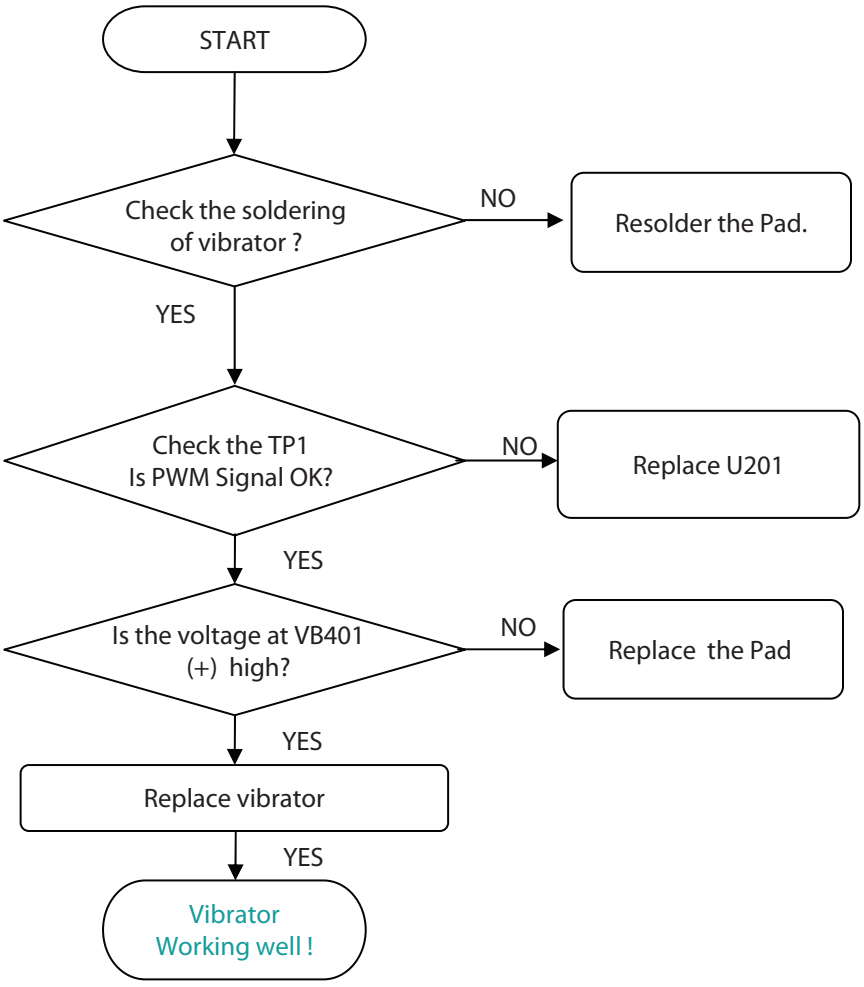




CHECKING FLOW

SETTING : Enter the engineering mode, and set vibrator on at vibration of BB test menu



4.7 LCD Trouble

TEST POINT

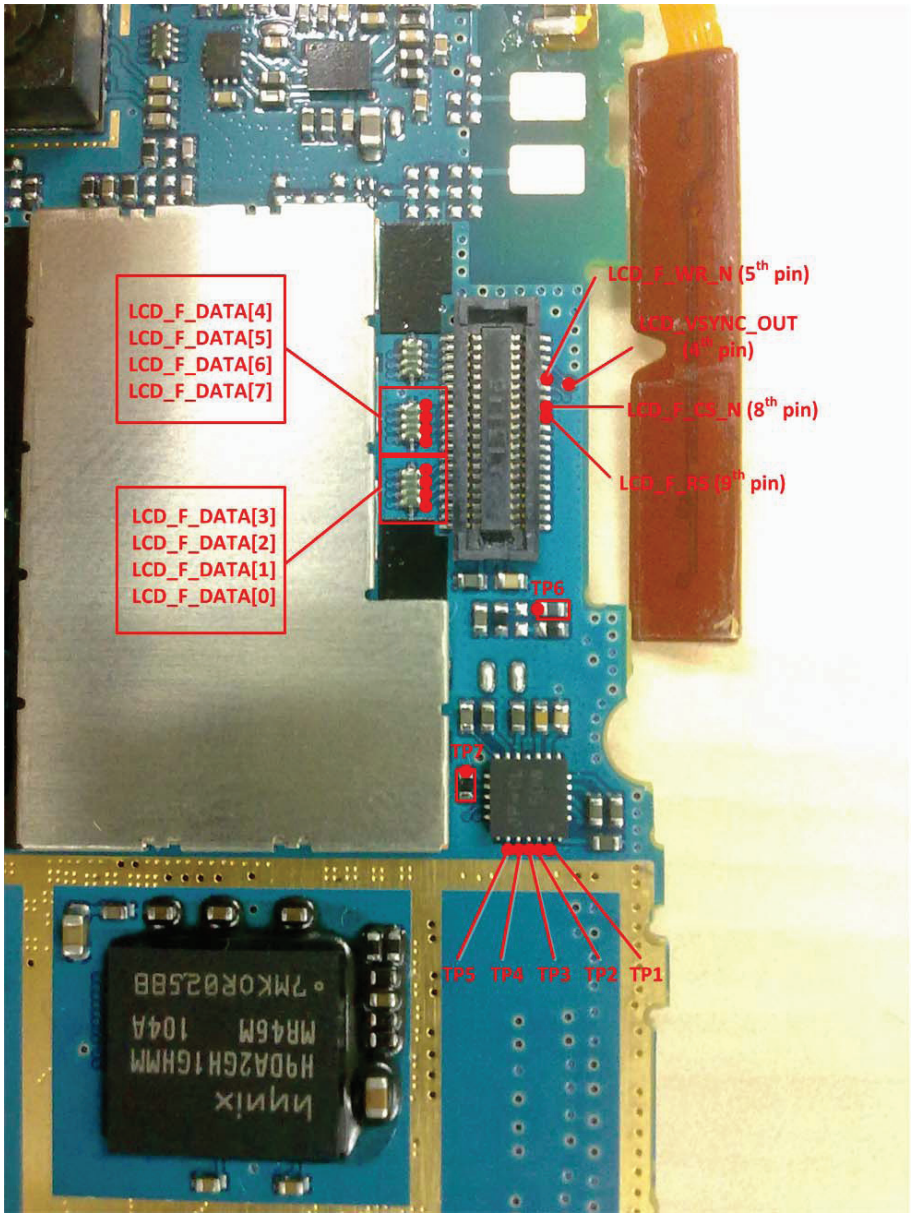
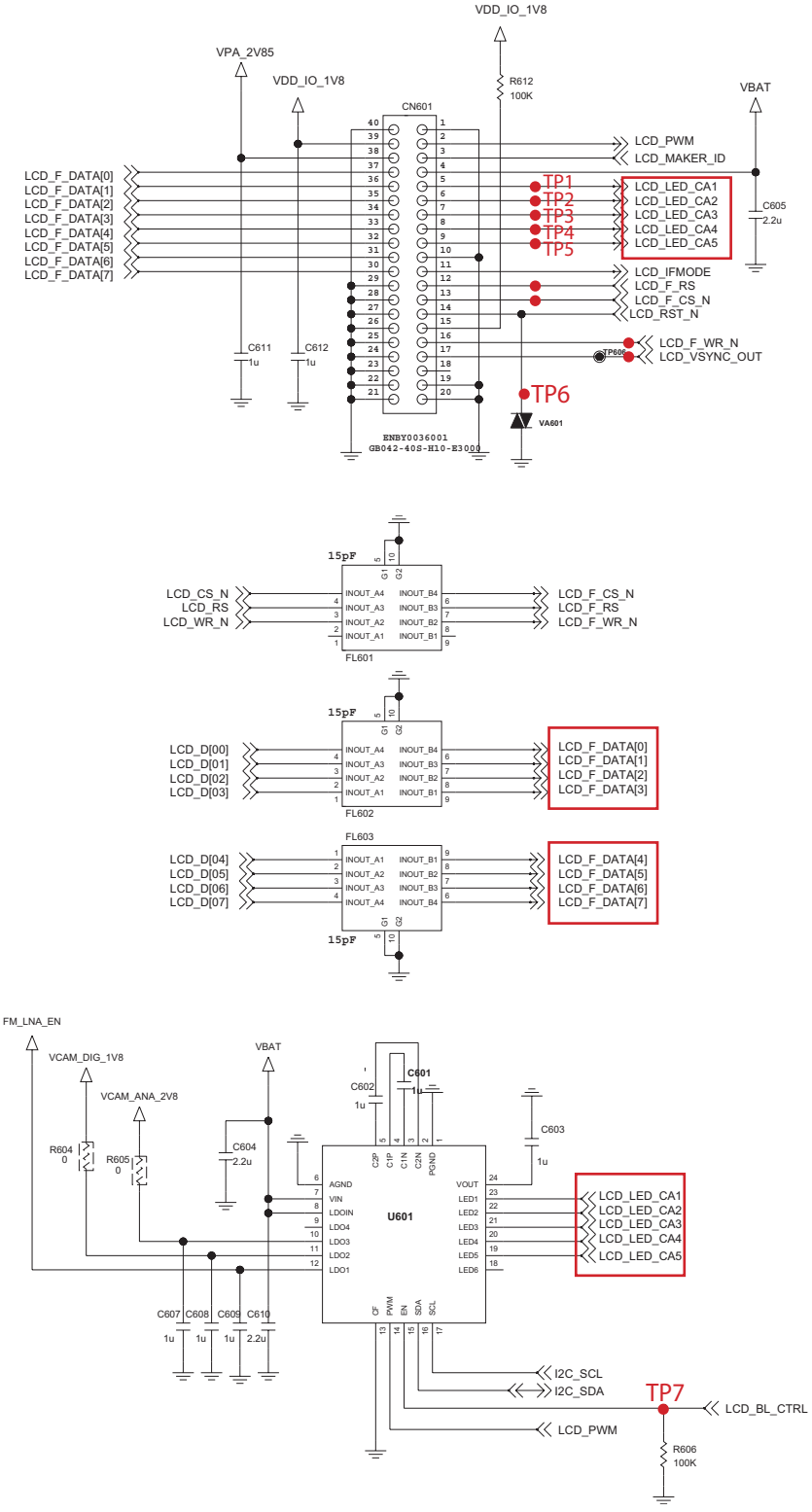
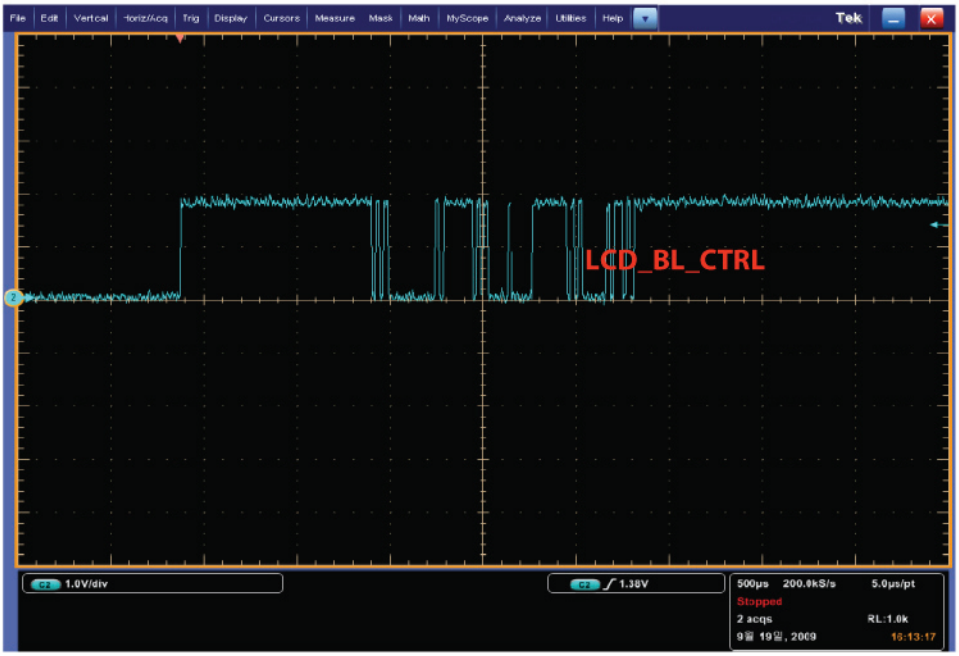


Figure 4.7

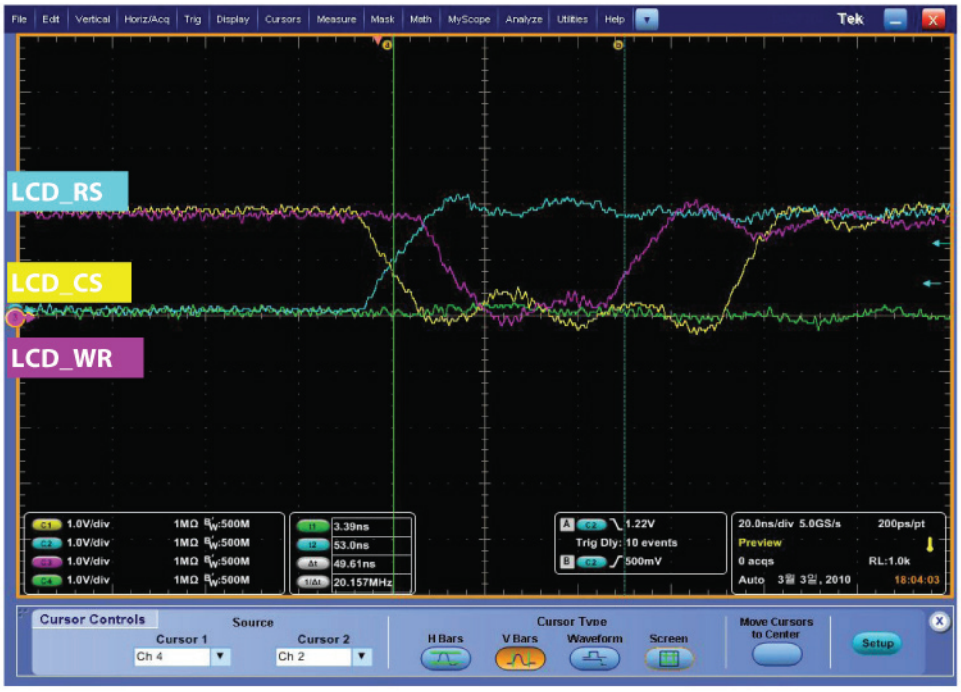
CIRCUIT



Waveform

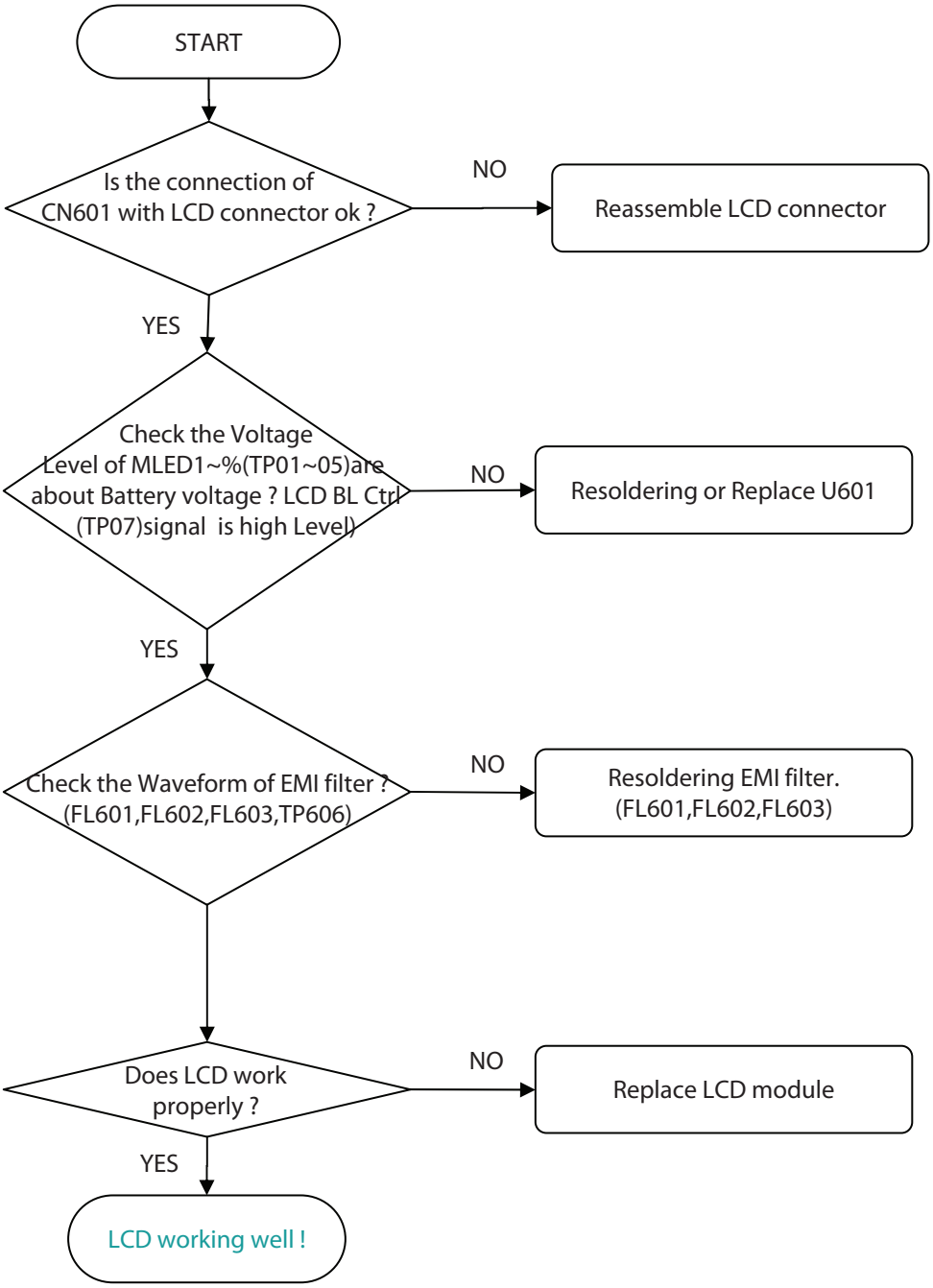


Graph 4.7.1. LCD Backlight Control Signal Waveform



Graph 4.7.2. LCD Data Waveform

CHECKING FLOW



4.8 Camera Trouble

TEST POINT

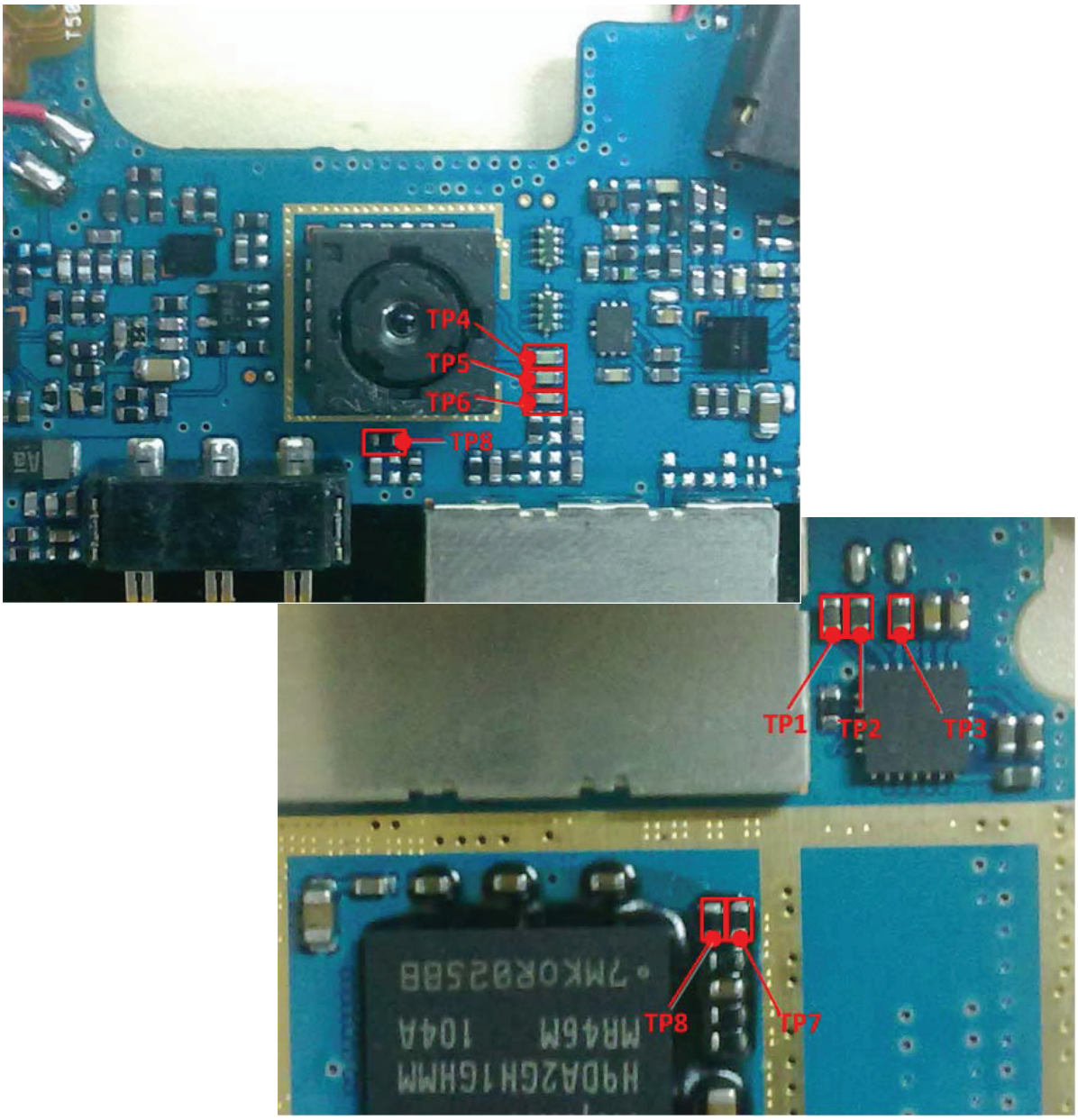
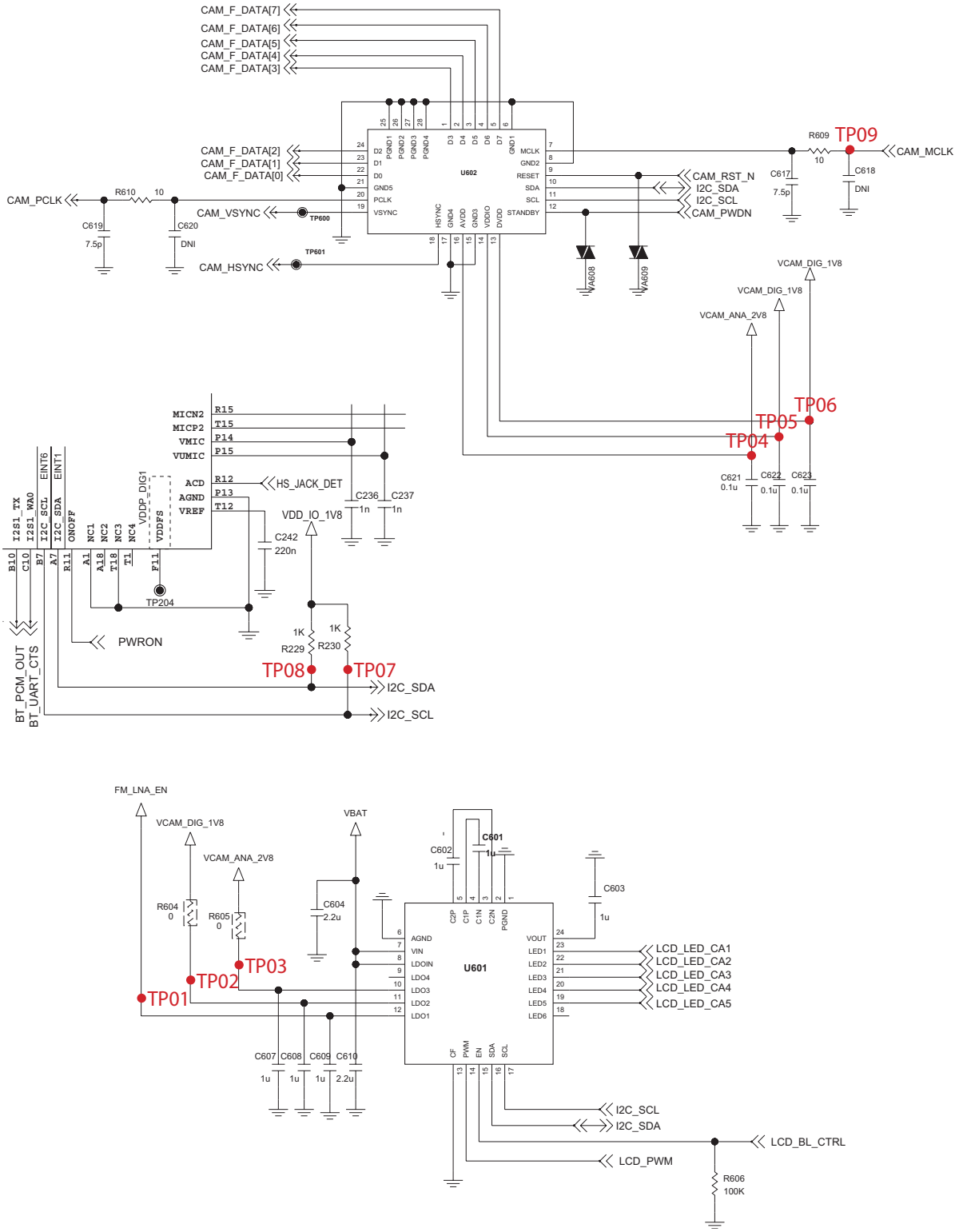


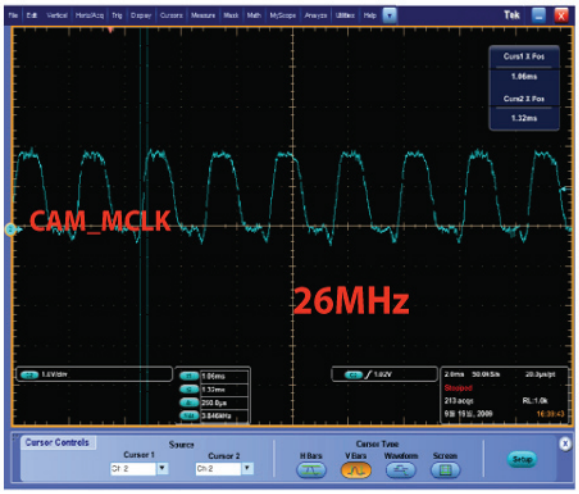
Figure 4.8

CIRCUIT

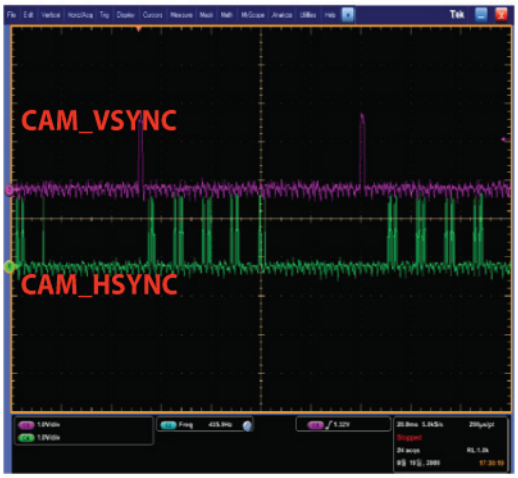


Waveform

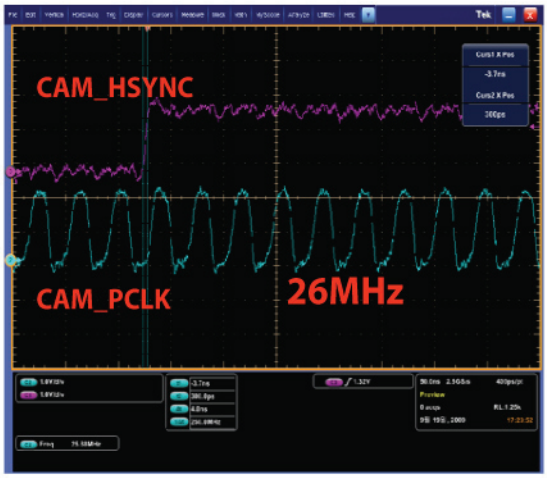
Graph 4.8.1. I2C Data Waveform



Graph 4.8.2. MCLK Waveform

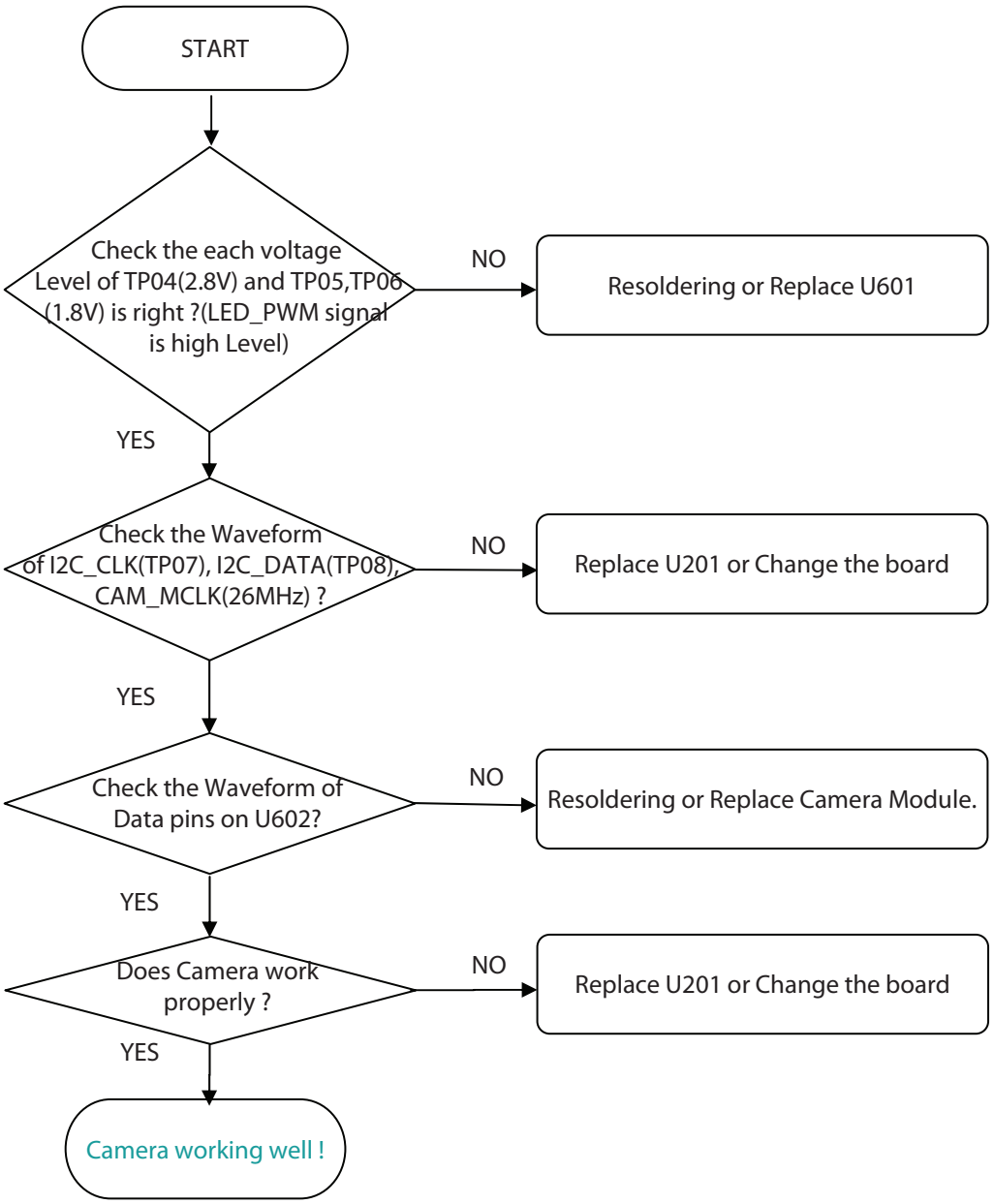


Graph 4.8.3.CAM_VSYNC vs. CAM_HSYNC Waveform



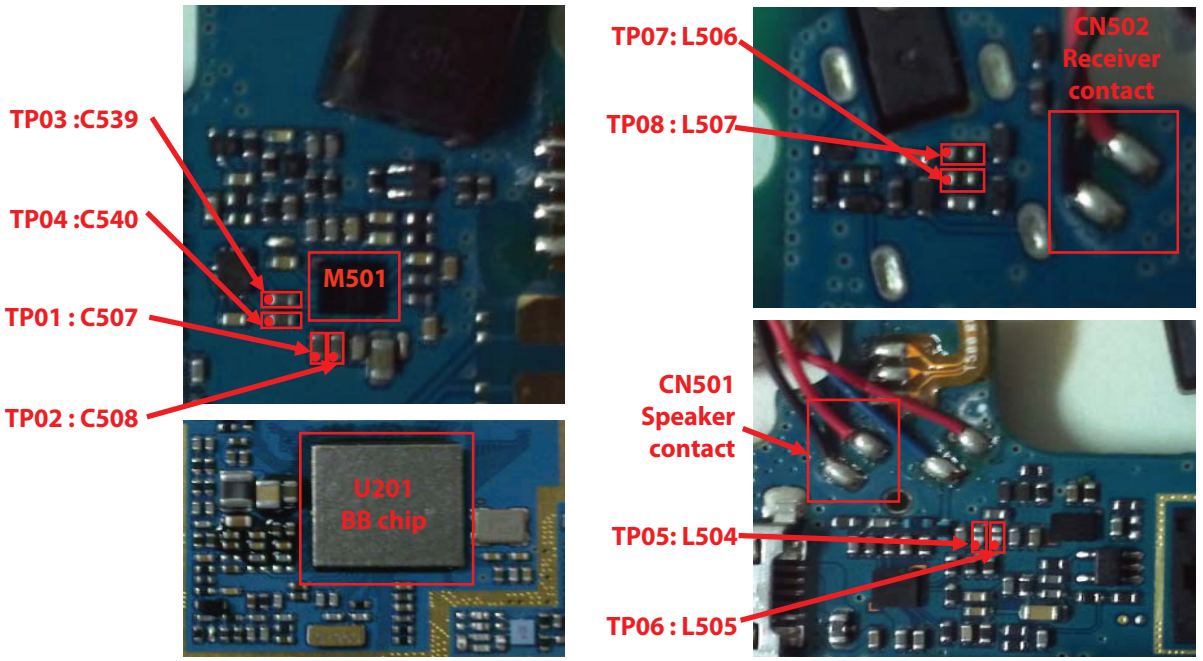
Graph 4.8.4.CAM_HSYNC vs. CAM_PCLK Waveform

CHECKING FLOW

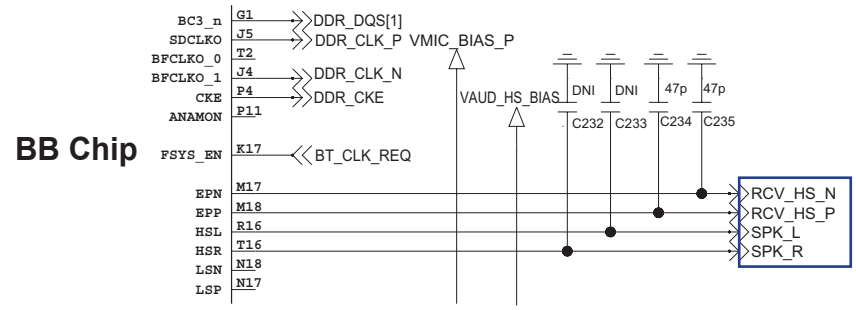


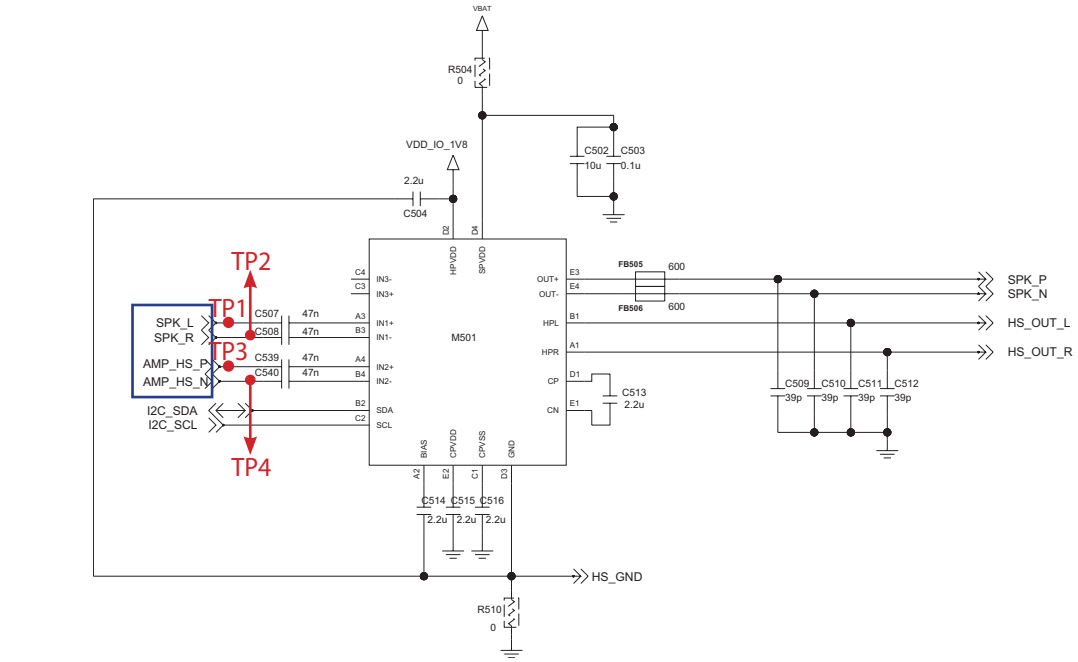
4.9 Speaker / Receiver Trouble

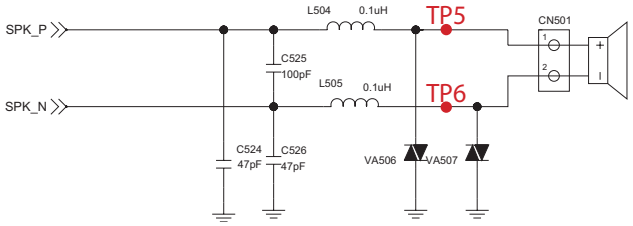
TEST POINT

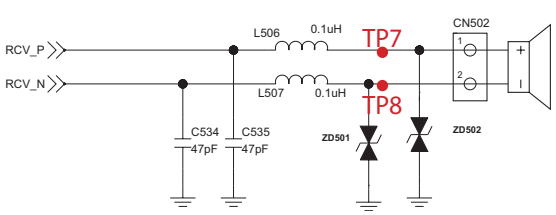


CIRCUIT

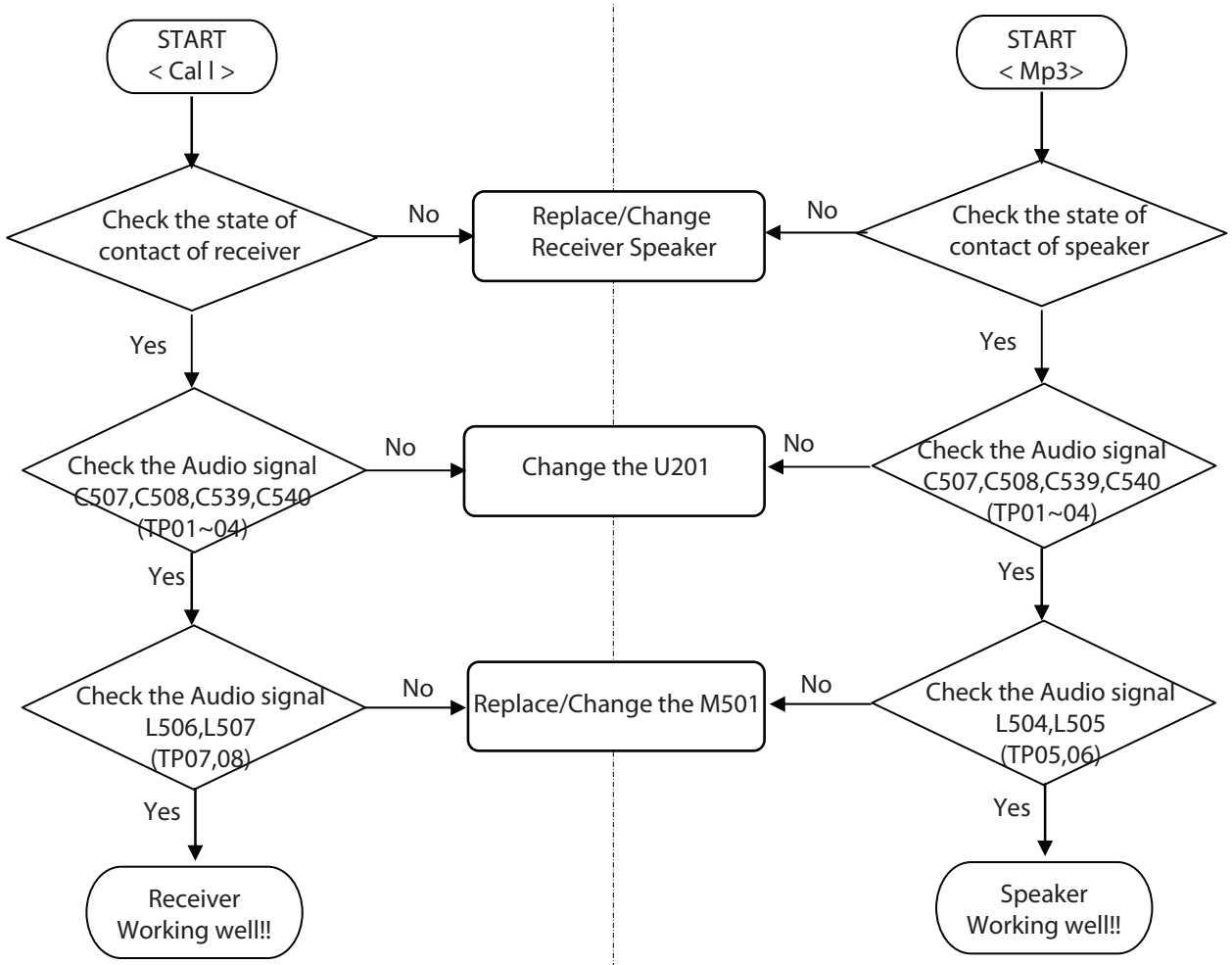






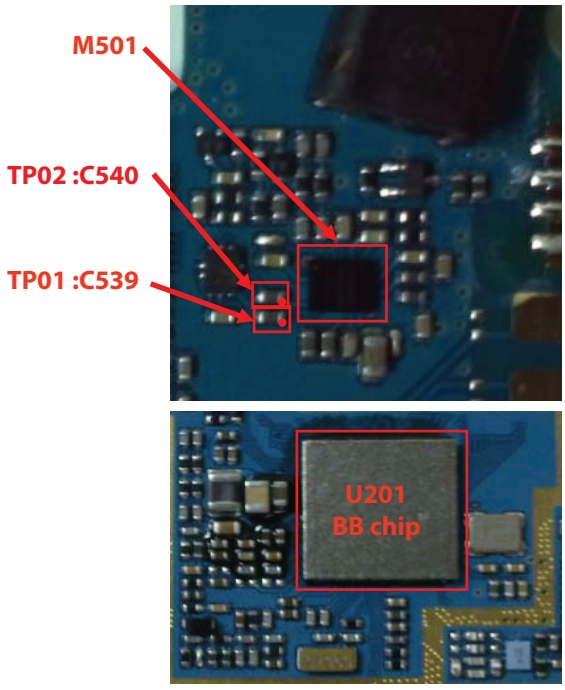


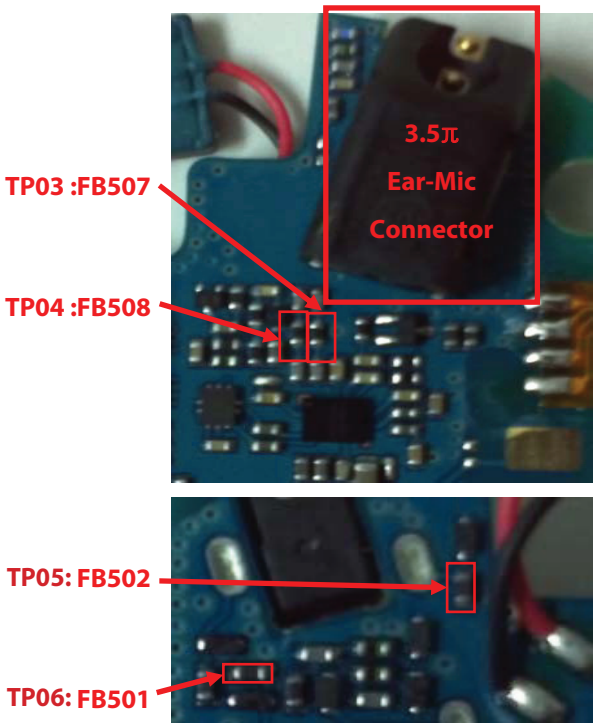
CHECKING FLOW

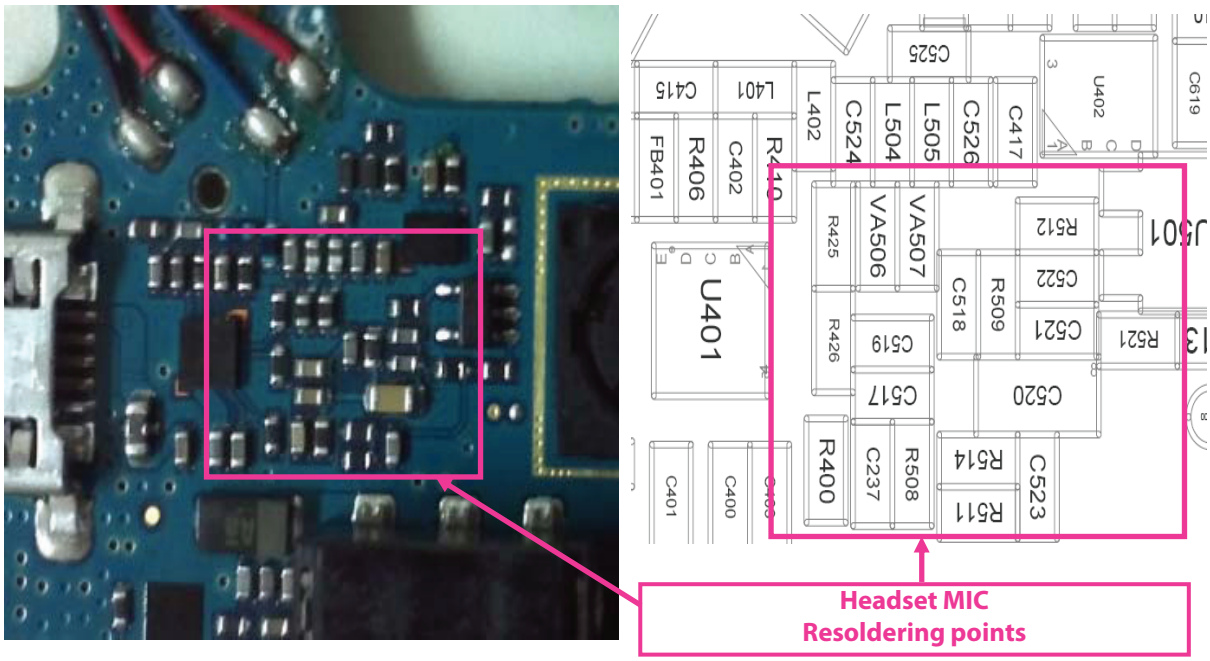


4.10 Earphone Trouble

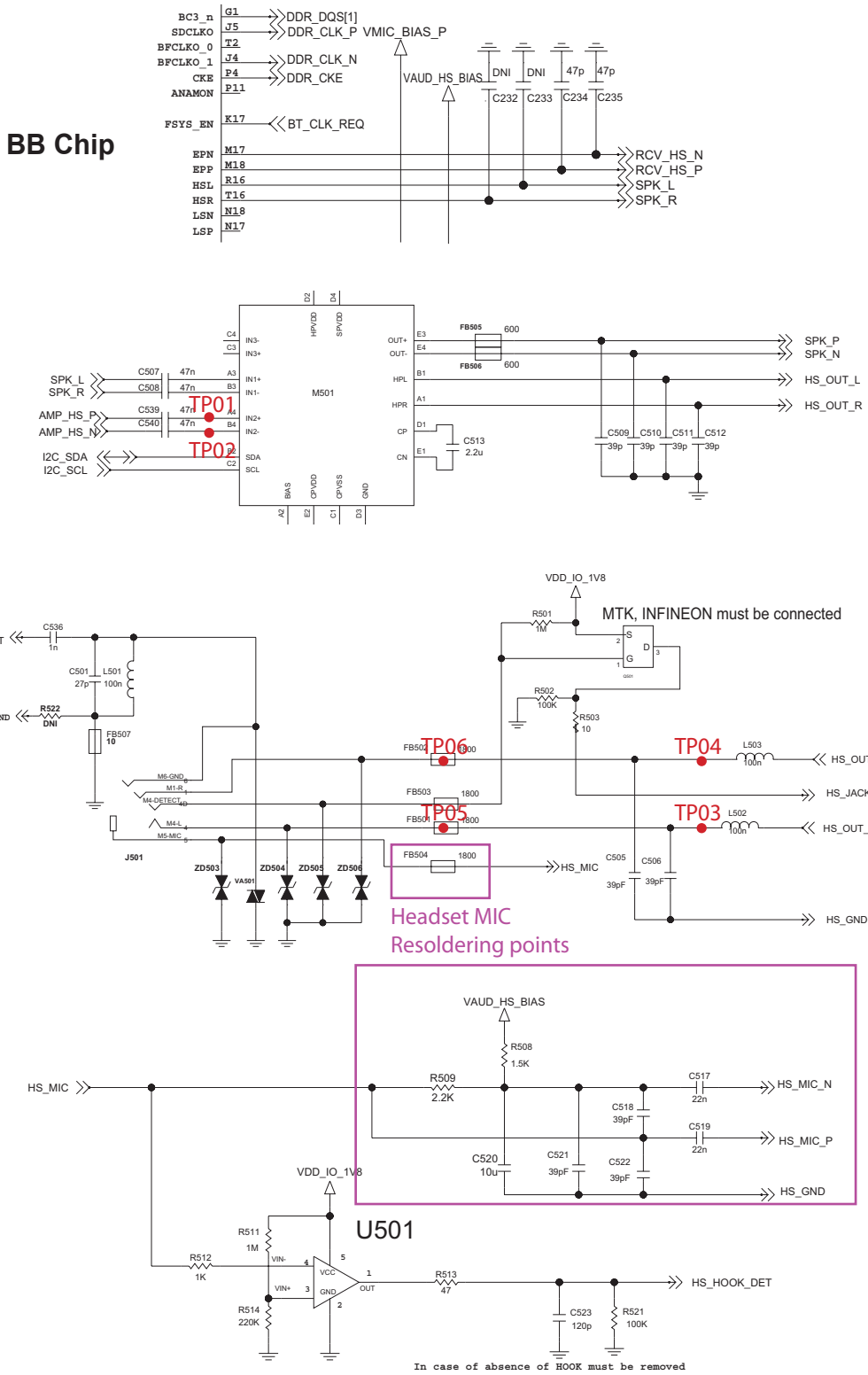
TEST POINT



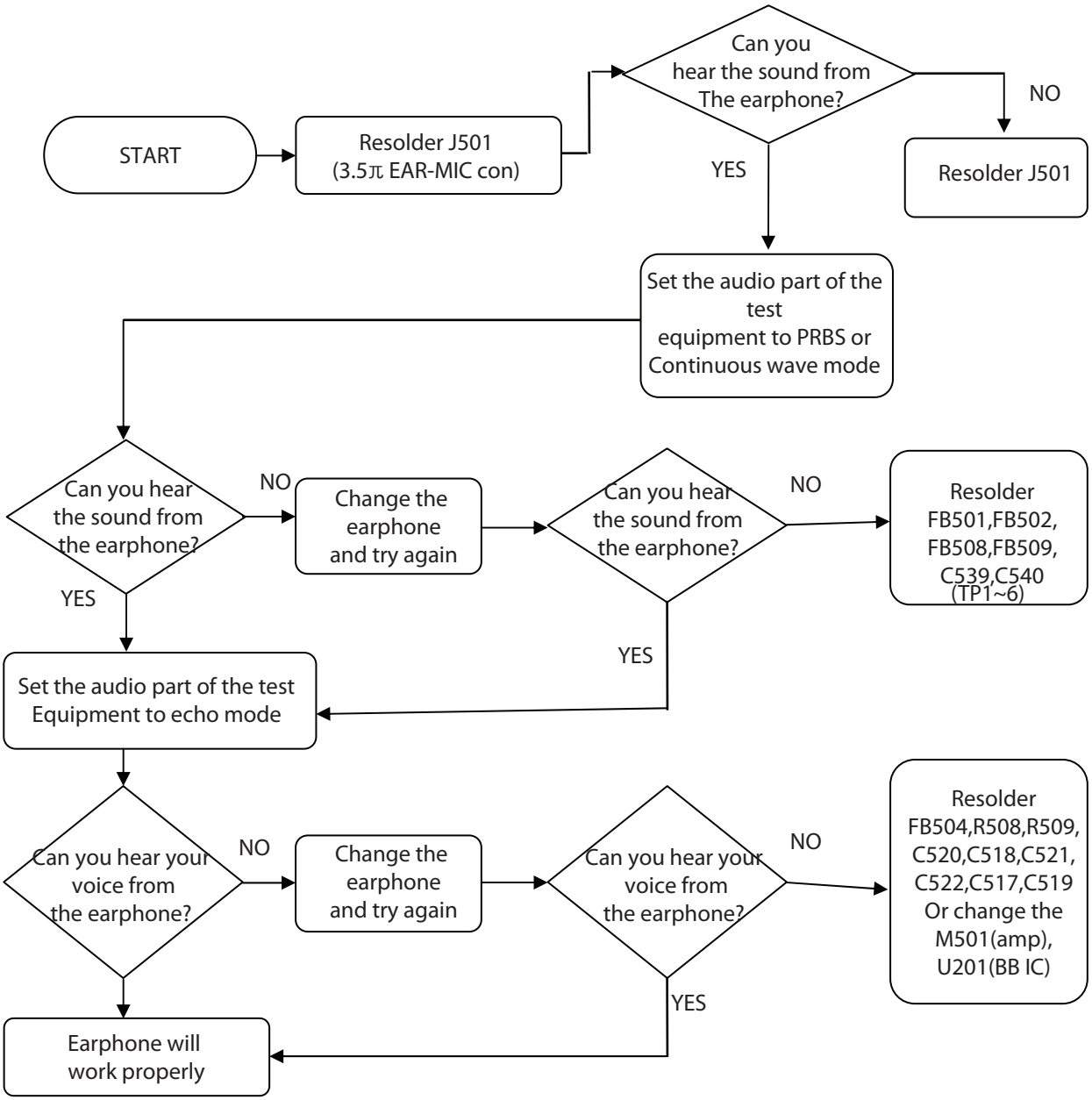




CIRCUIT



CHECKING FLOW



4.11 Microphone Trouble

TEST POINT

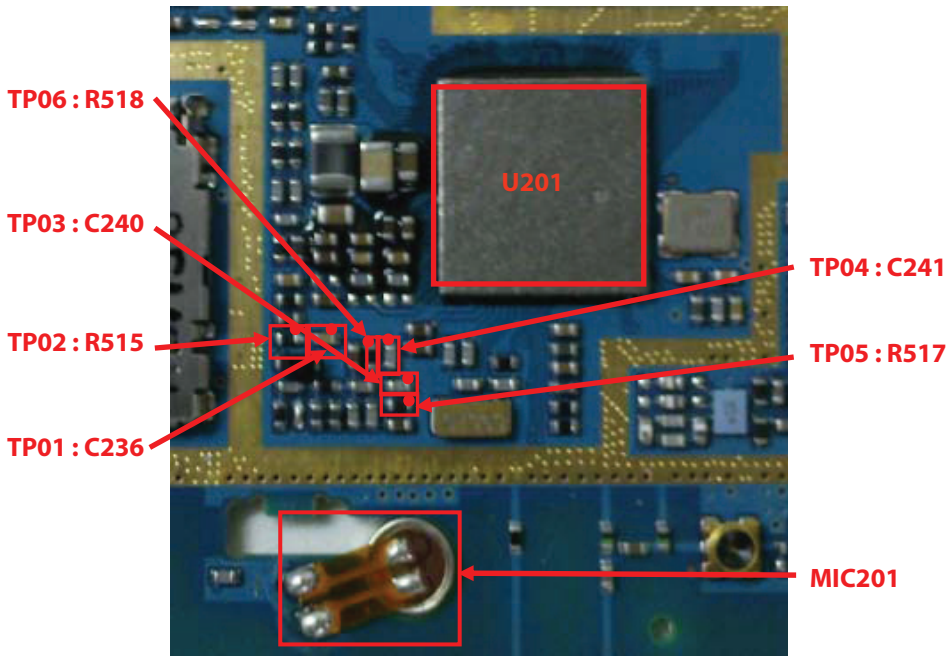
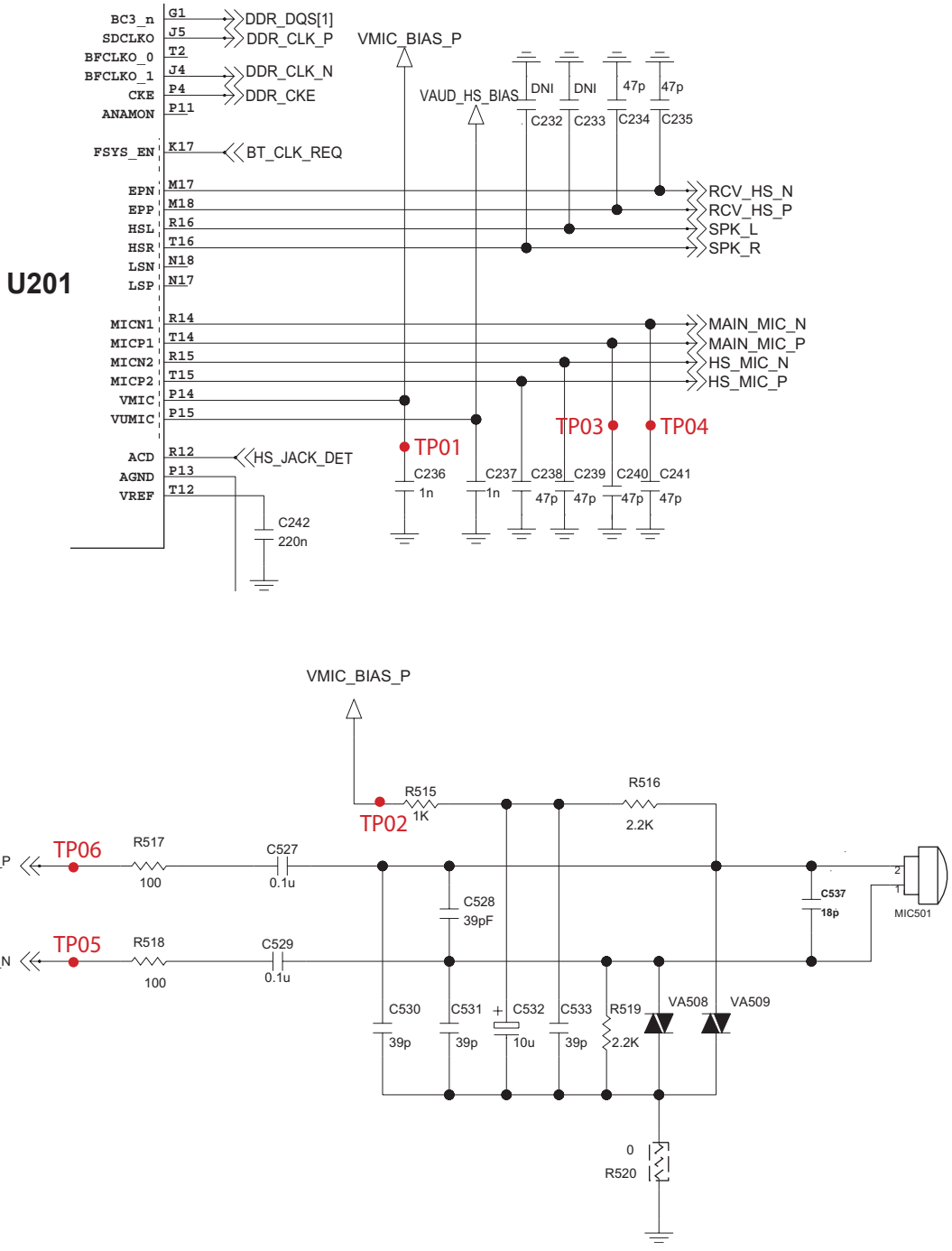


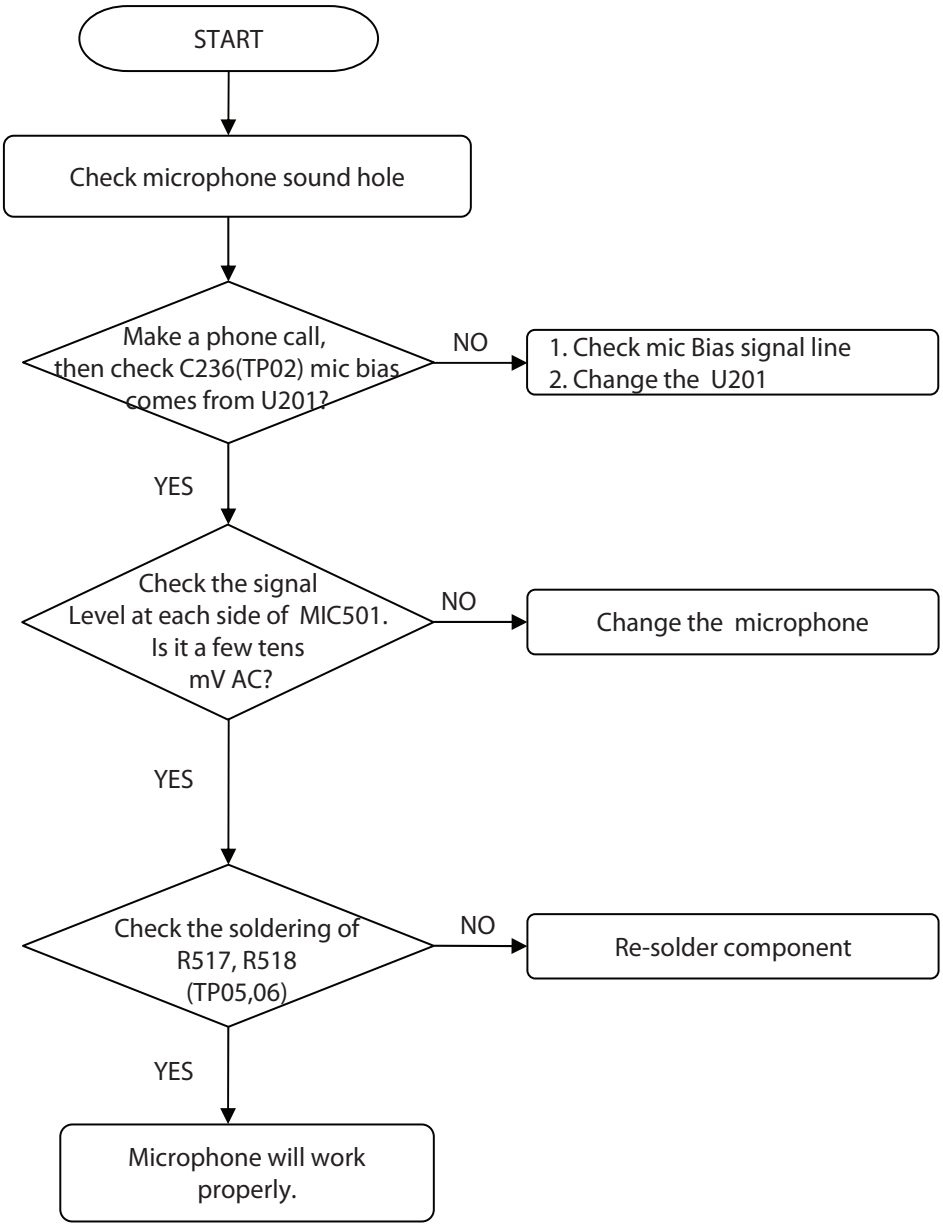
Figure 4.12

CIRCUIT



CHECKING FLOW

SETTING : After initialize Agilent 8960, Test EGSM900, DCS mode (or GSM850, PCS mode)



4.12 SIM Card Interface Trouble

TEST POINT

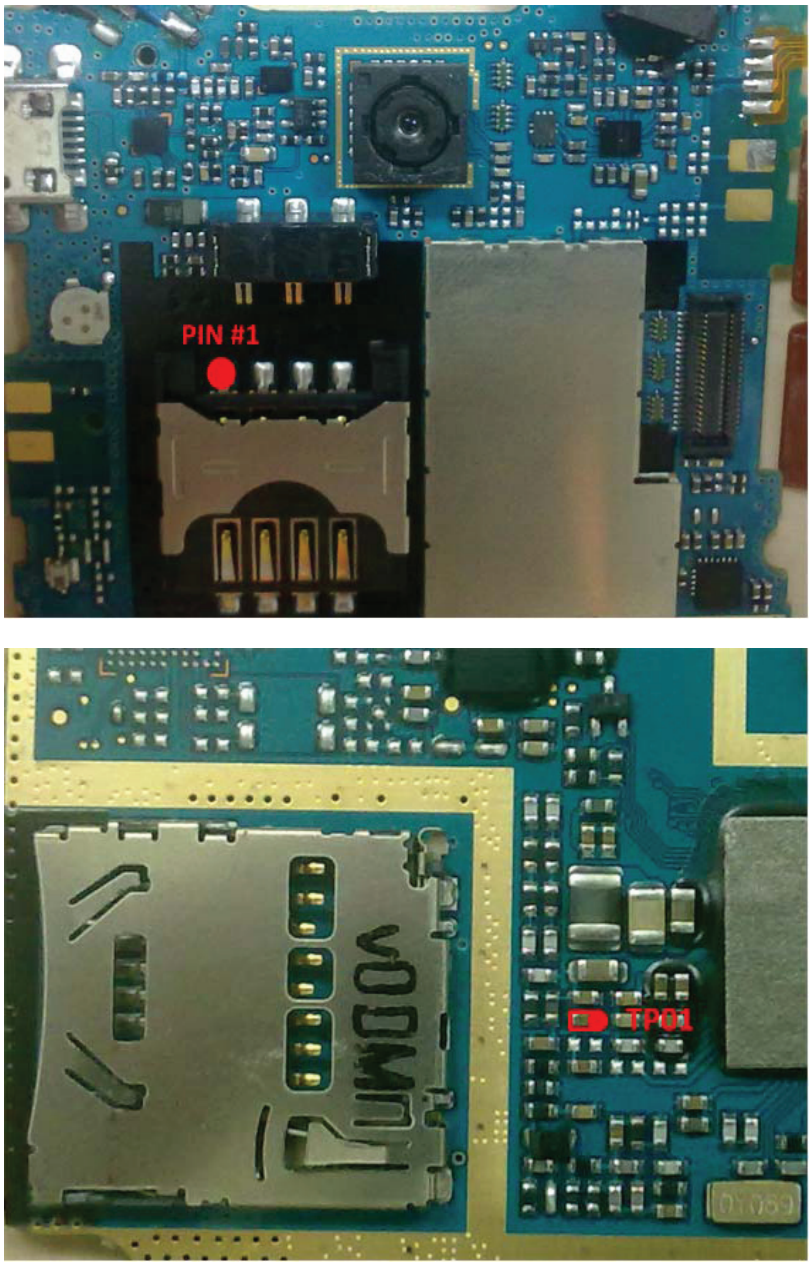
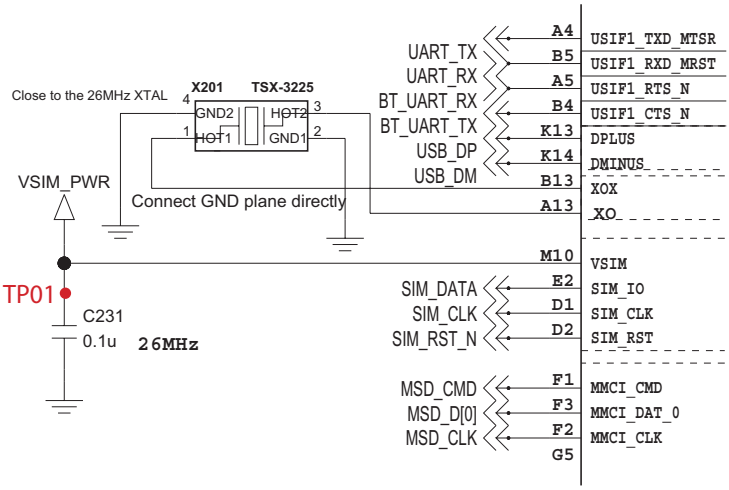
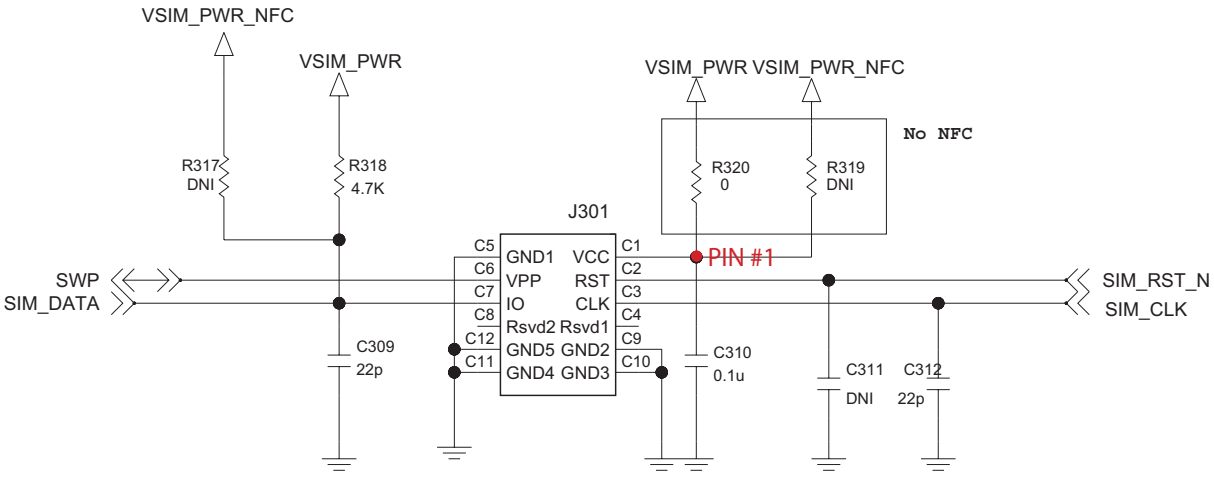


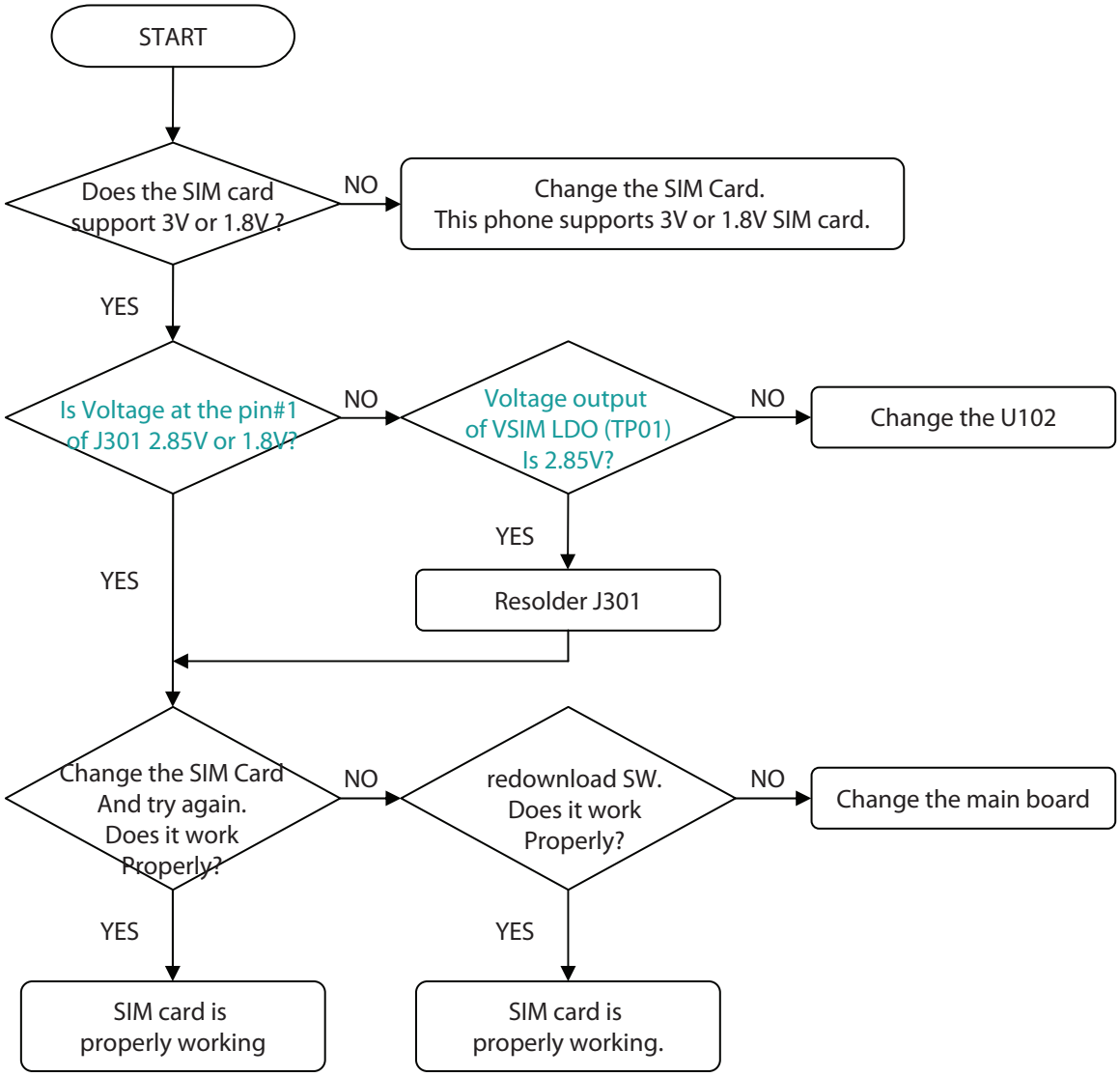
Figure 4.13

CIRCUIT





CHECKING FLOW



4.13 Micro SD (uSD) Trouble

TEST POINT

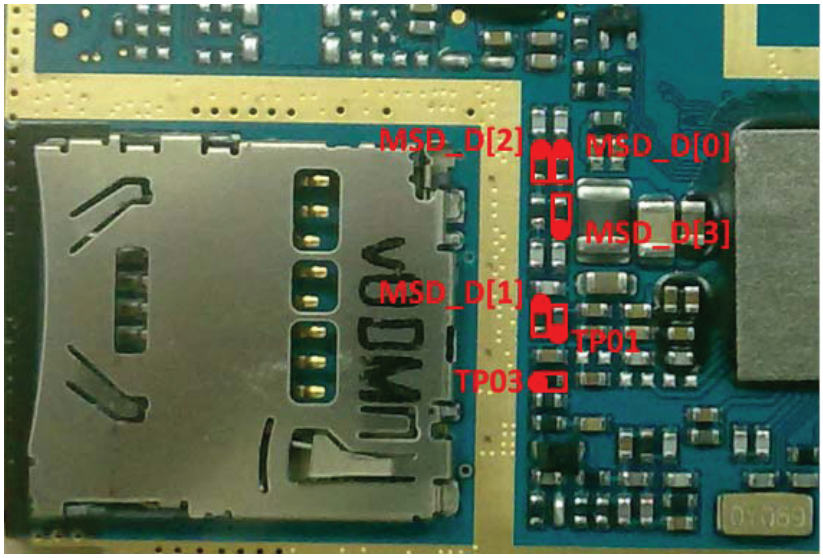
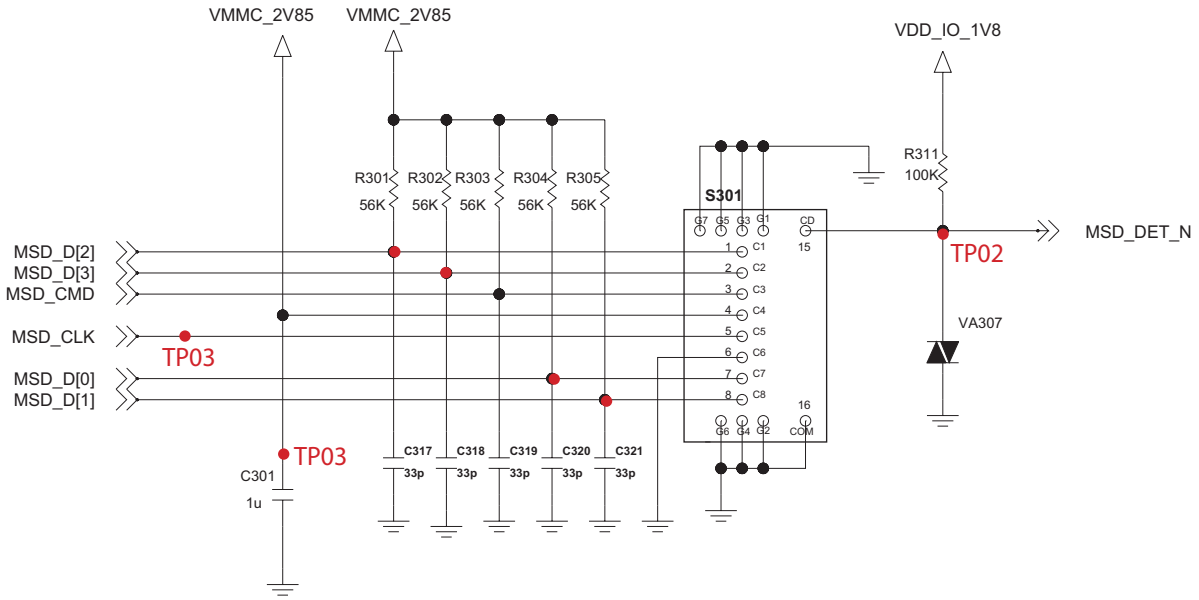
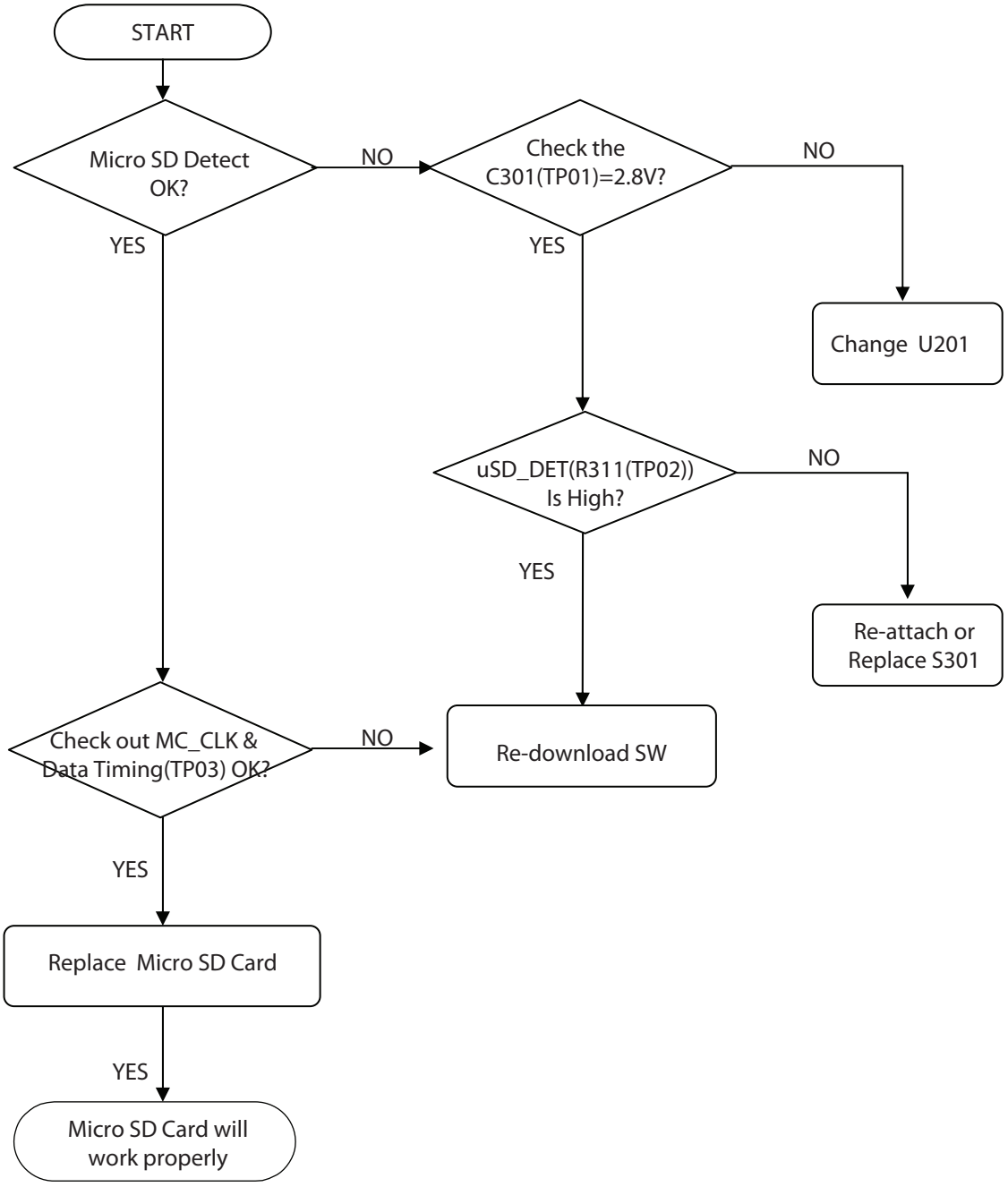


Figure 4.14

CIRCUIT



CHECKING FLOW



4.14 Bluetooth Trouble

TEST POINT

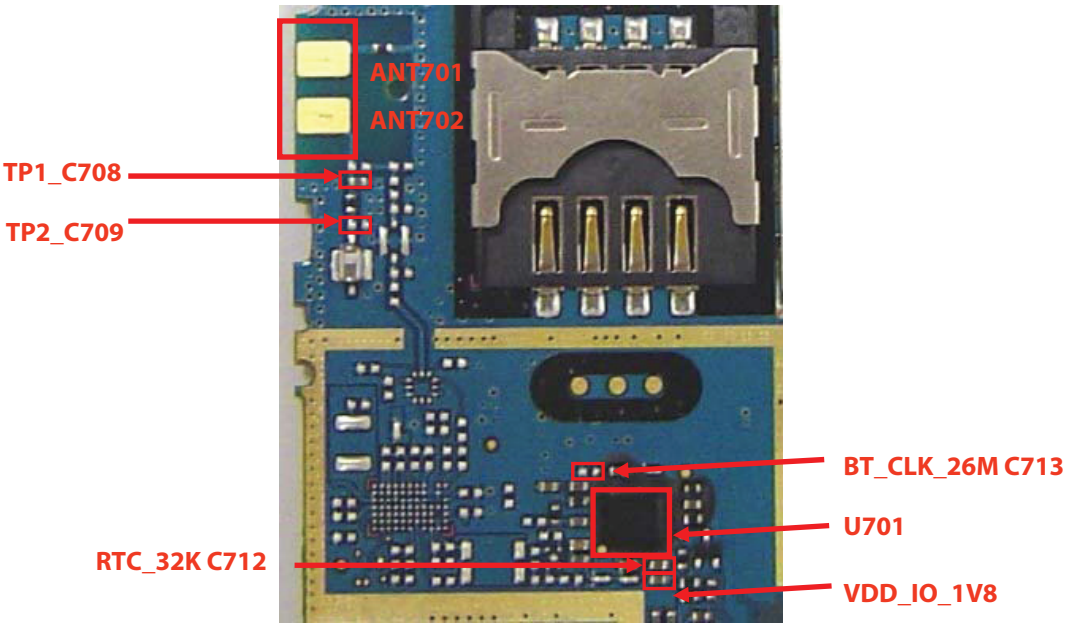
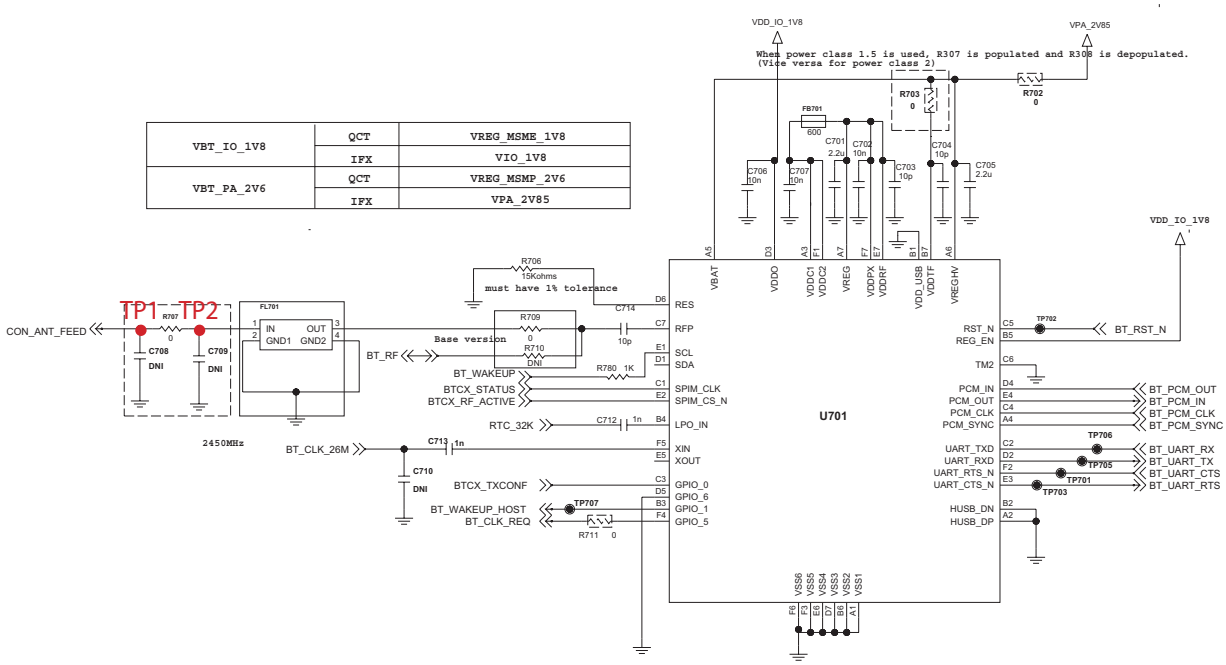
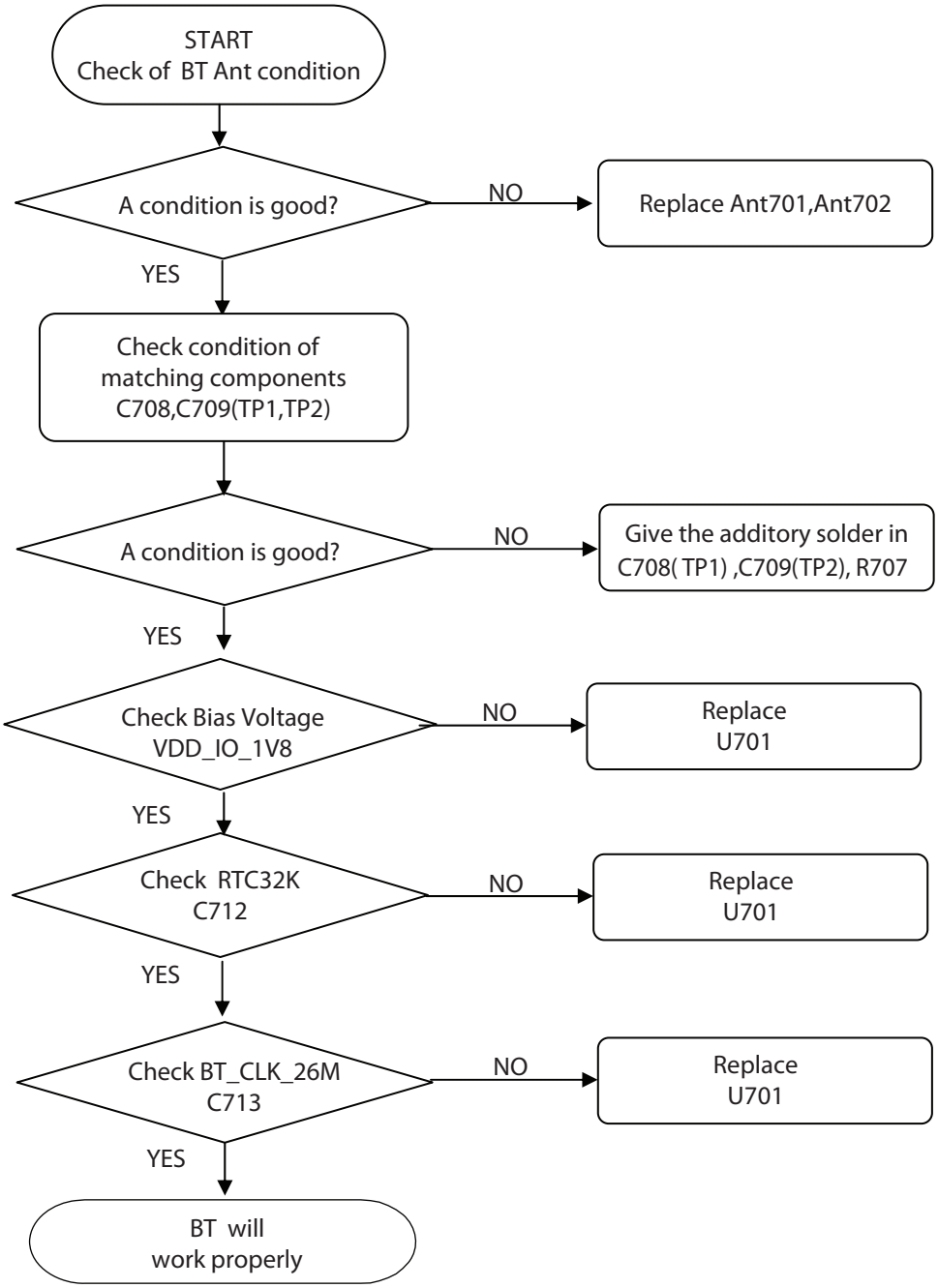


Figure 4.16.1

CIRCUIT



CHECKING FLOW



4.15 FM Radio Trouble

TEST POINT

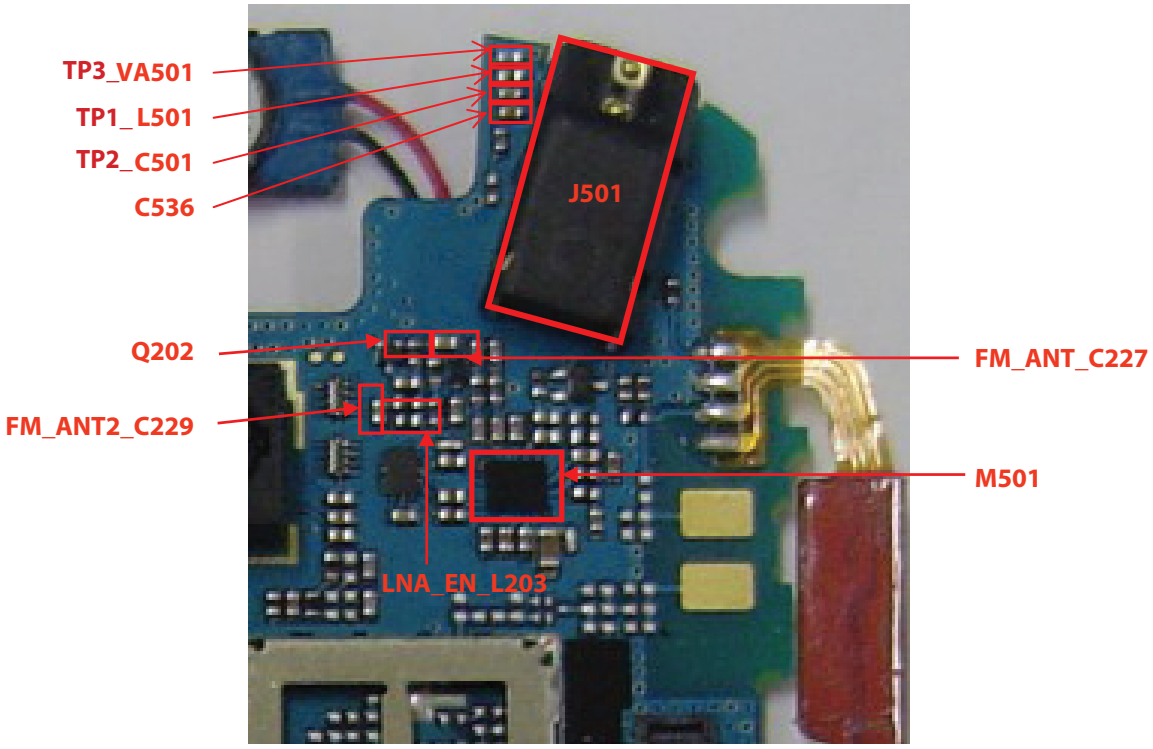
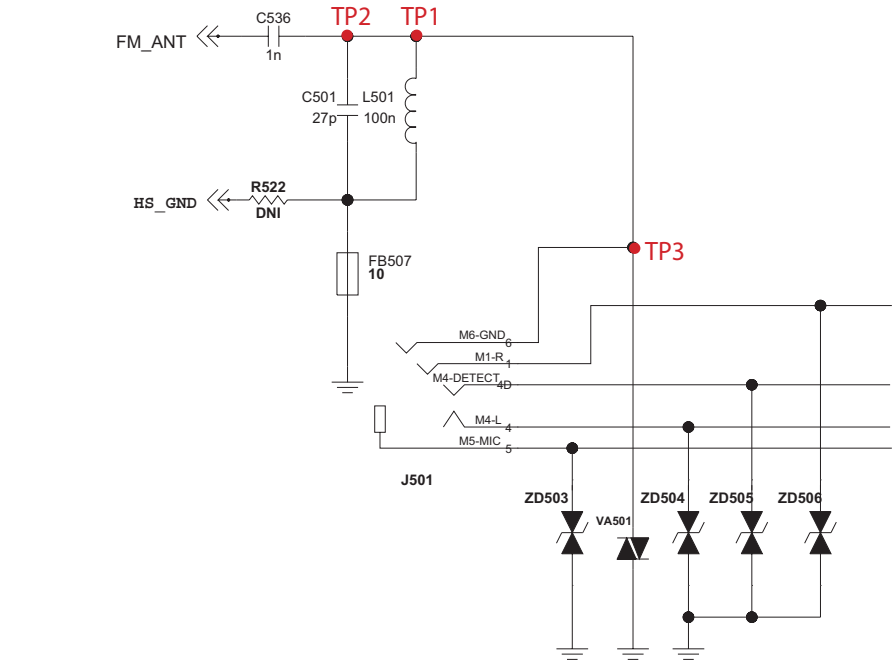
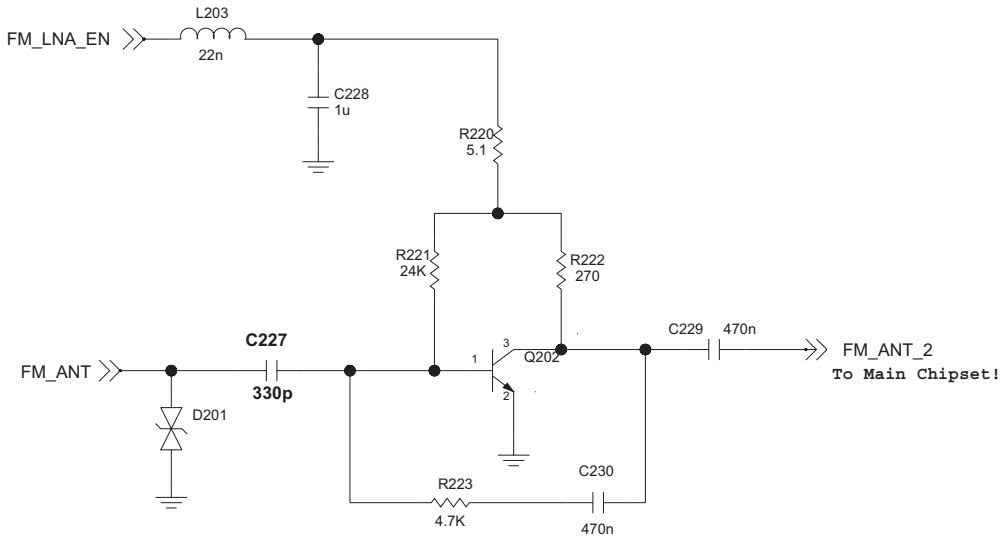


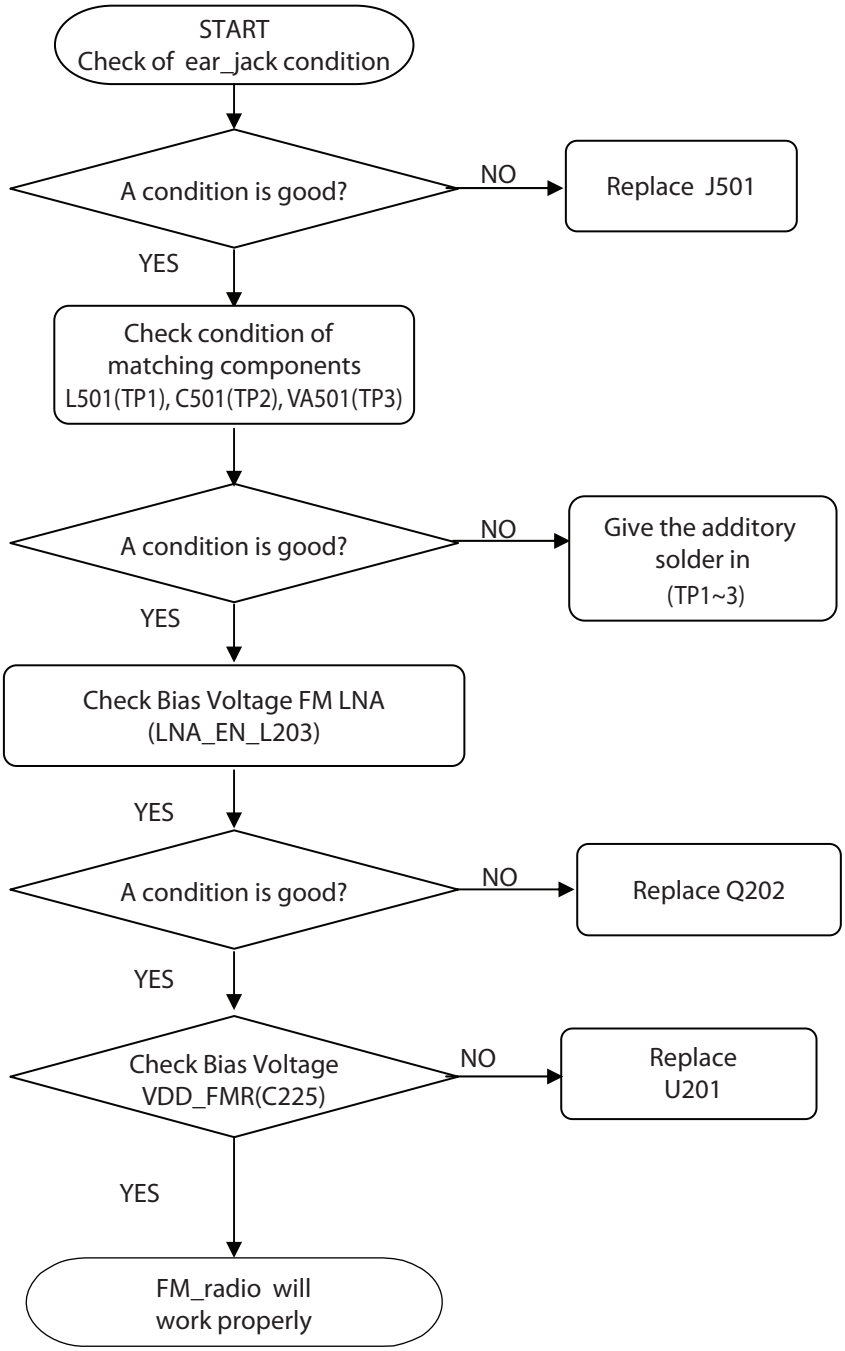
Figure 4.17

CIRCUIT



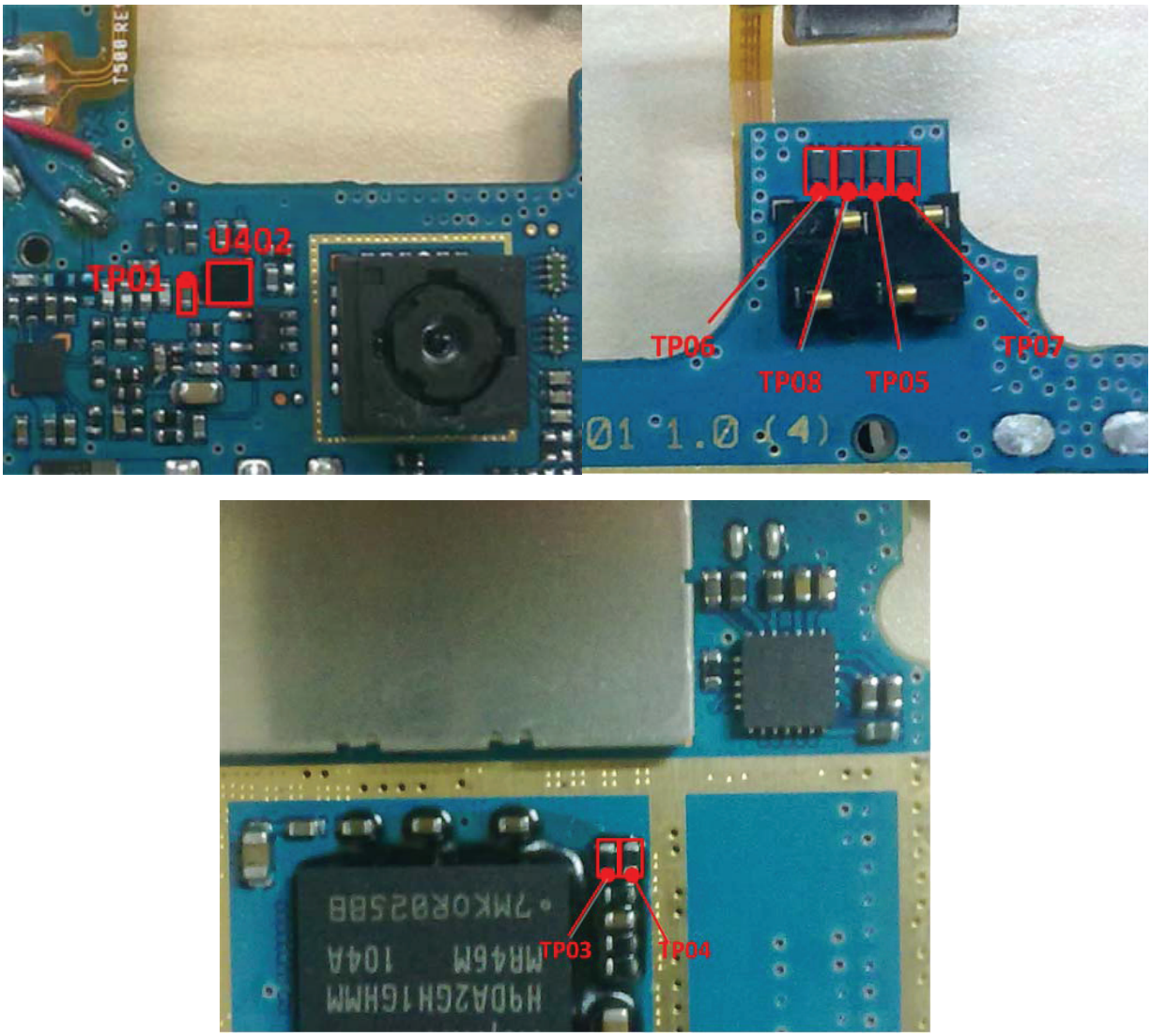


CHECKING FLOW

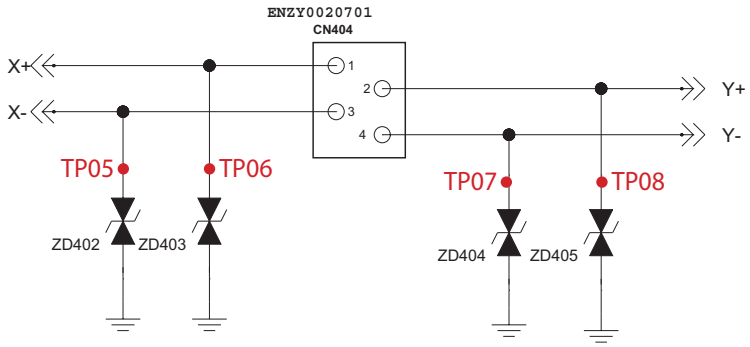


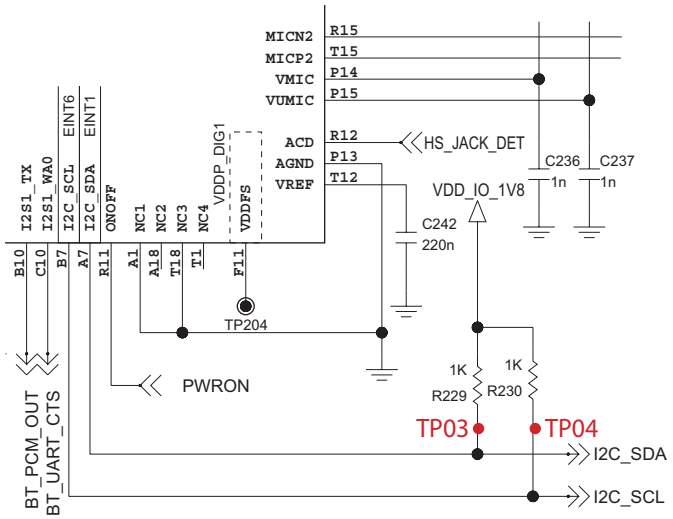
4.16 Touch trouble

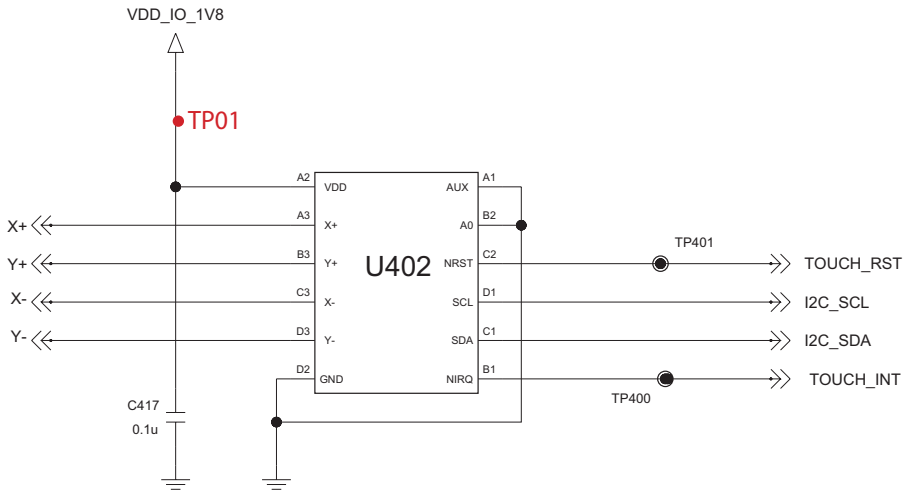
TEST POINT



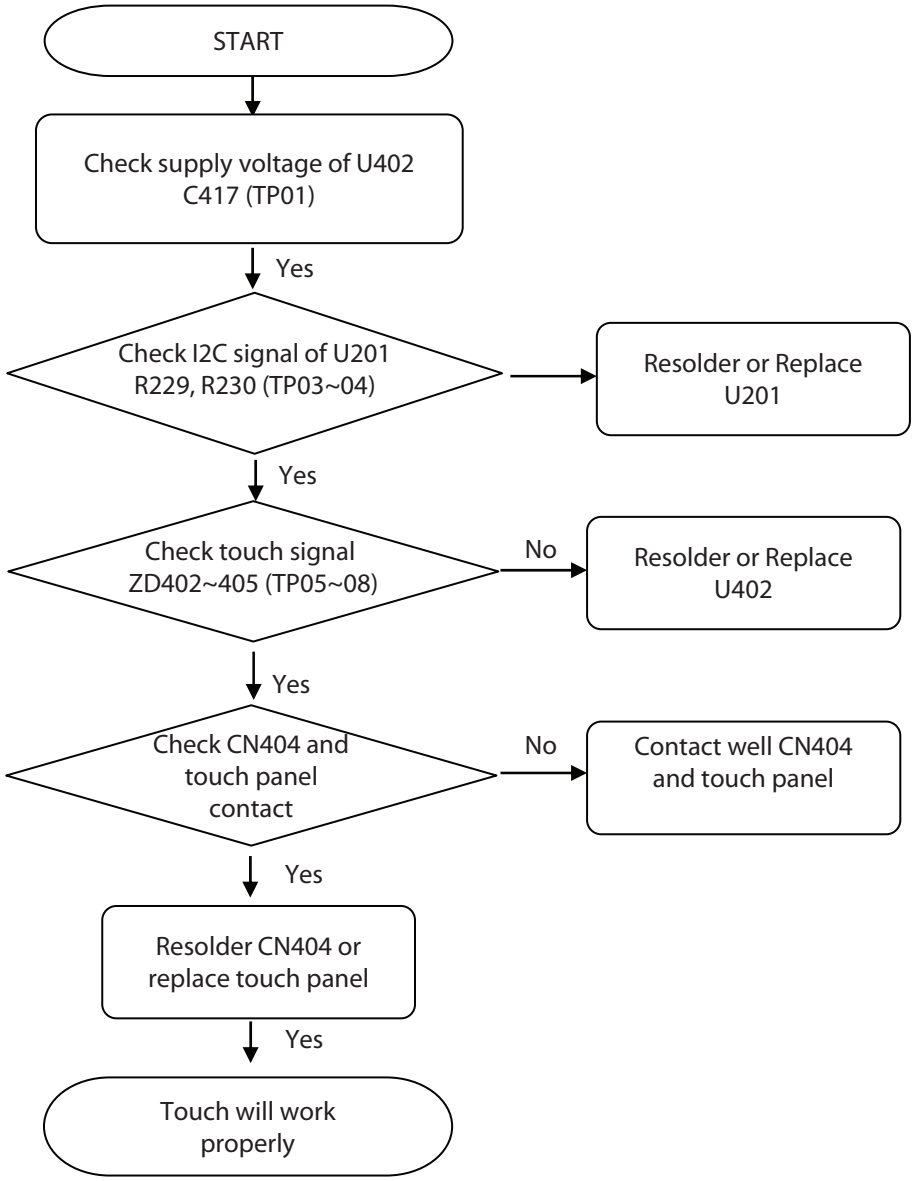
CIRCUIT



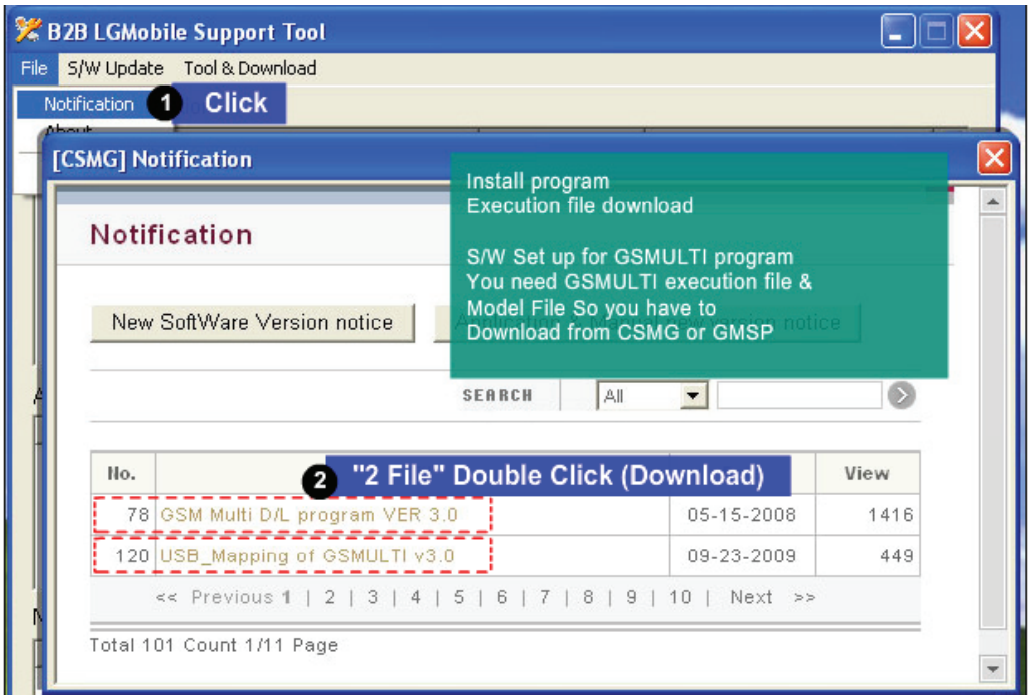


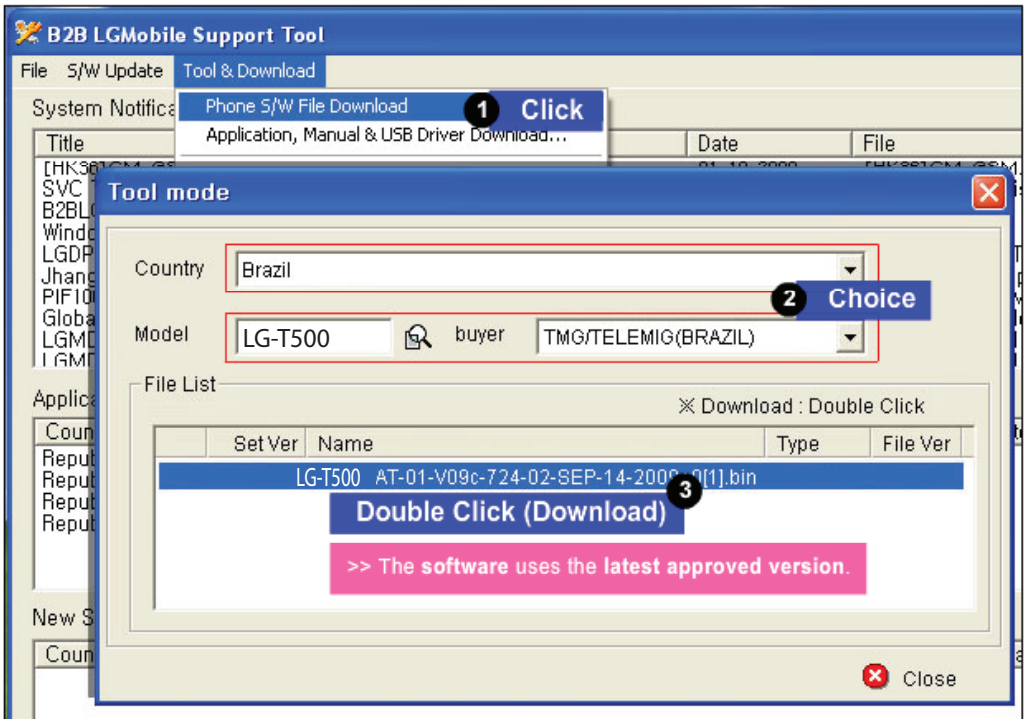


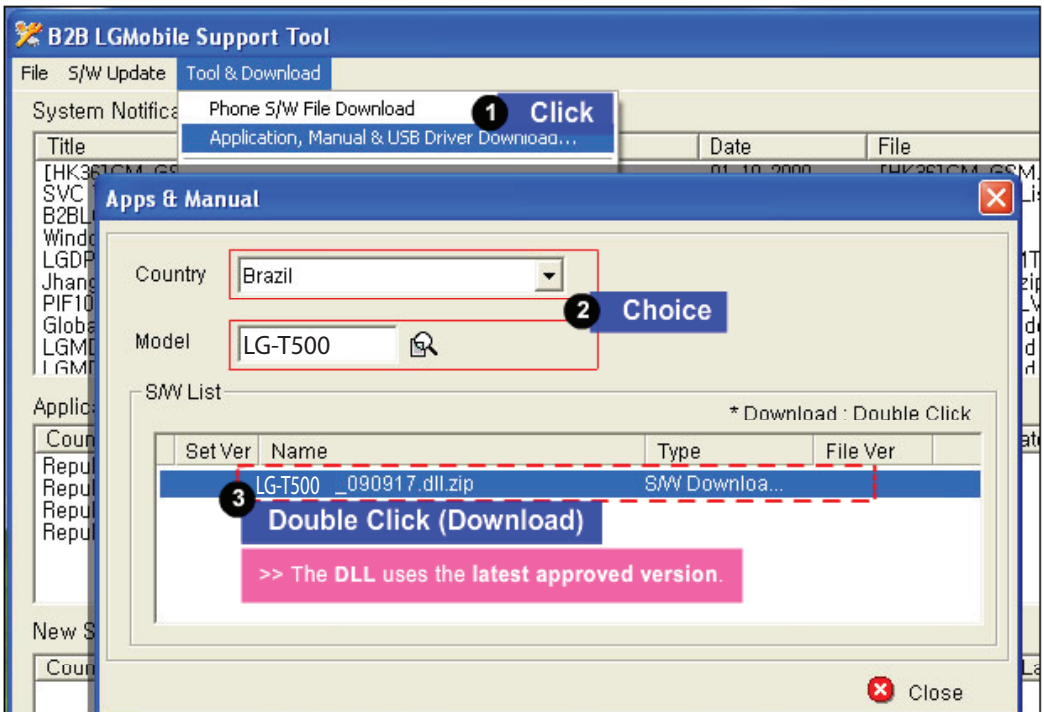
CHECKING FLOW

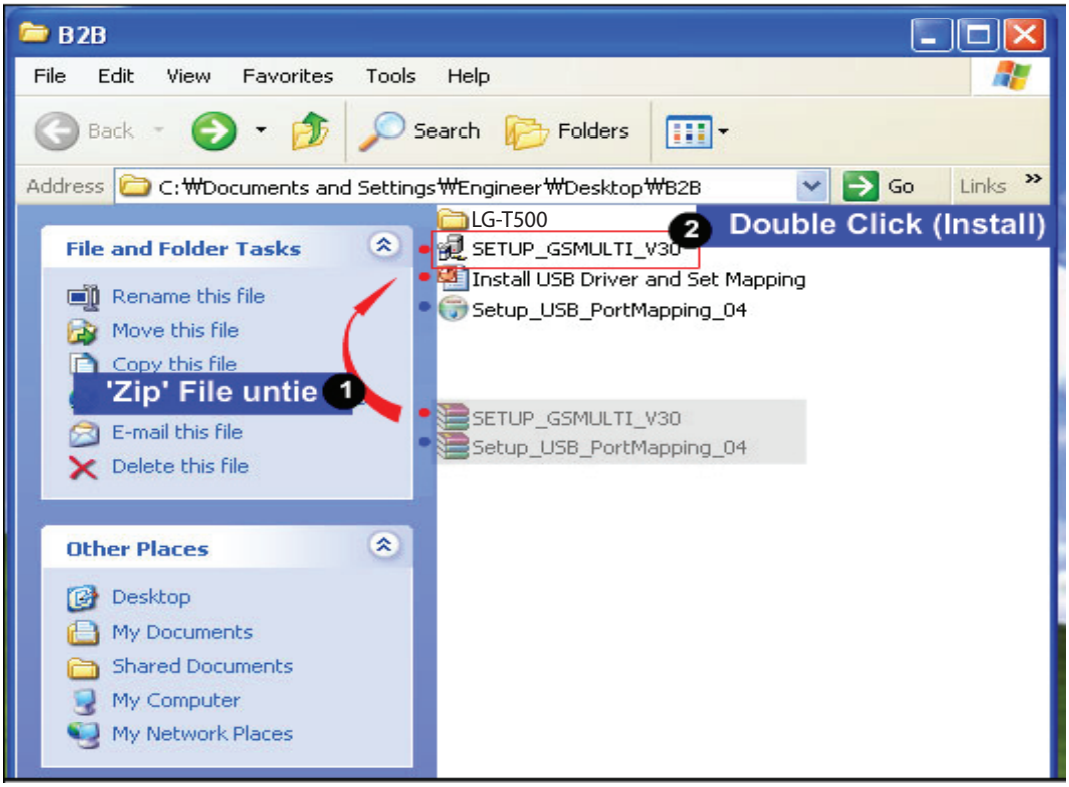


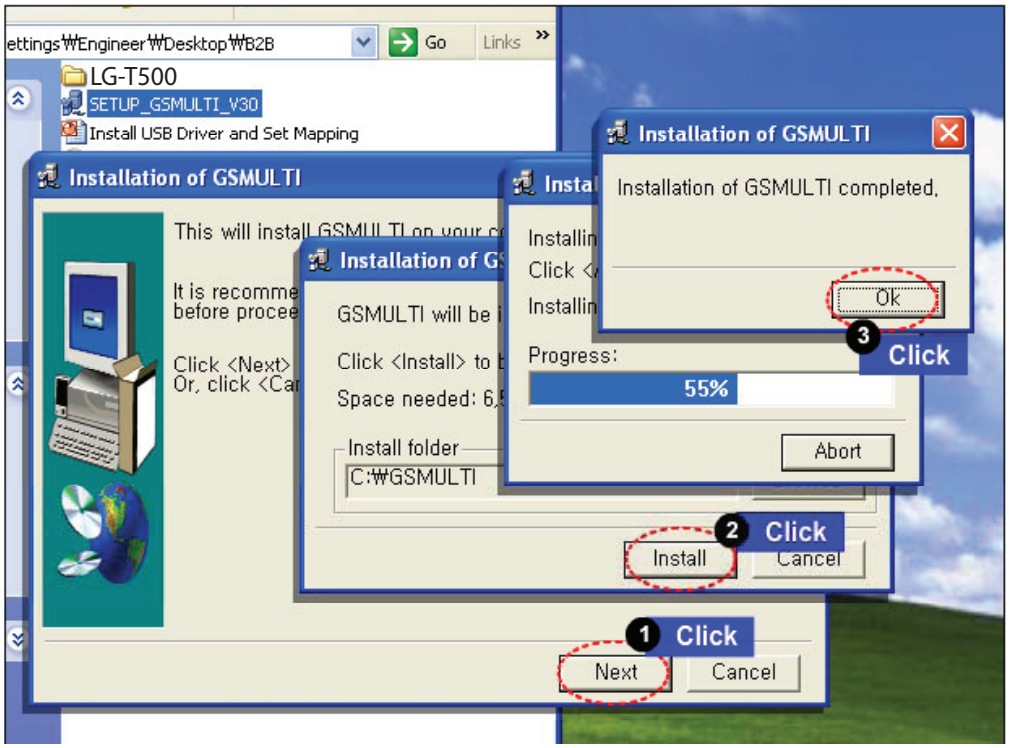
5. DOWNLOAD

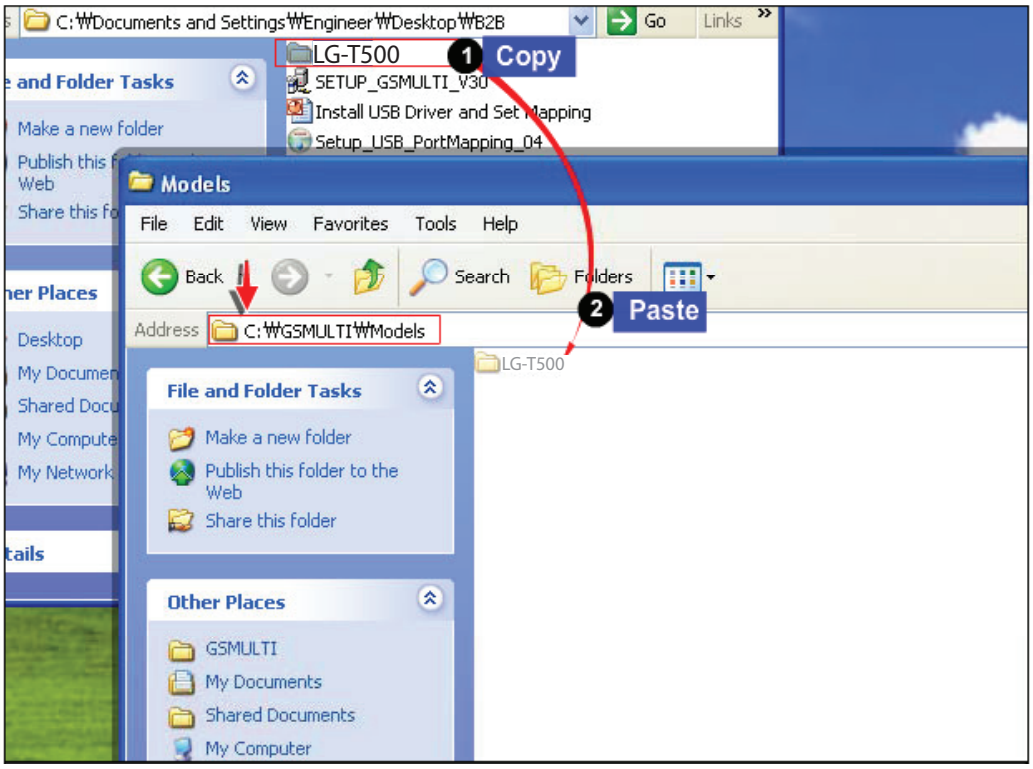


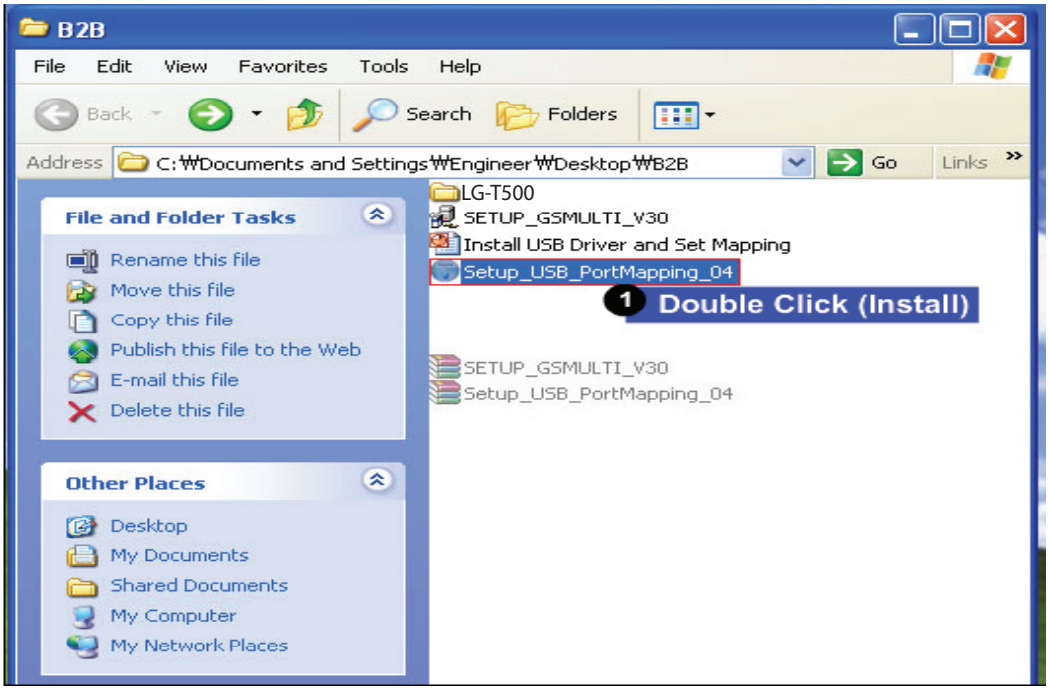


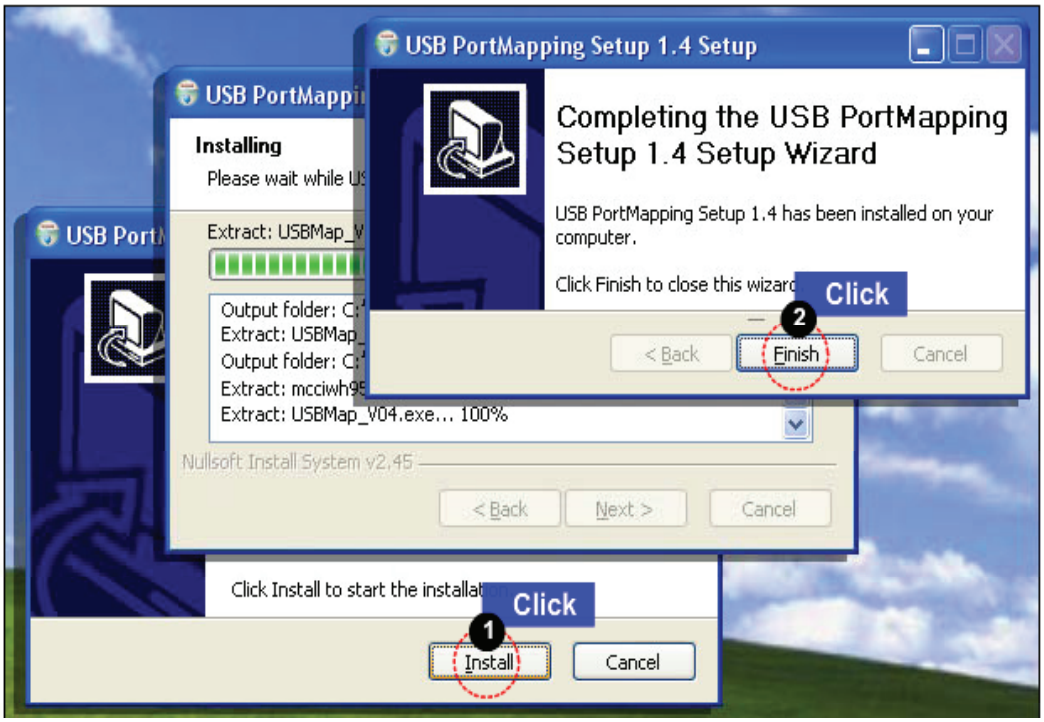


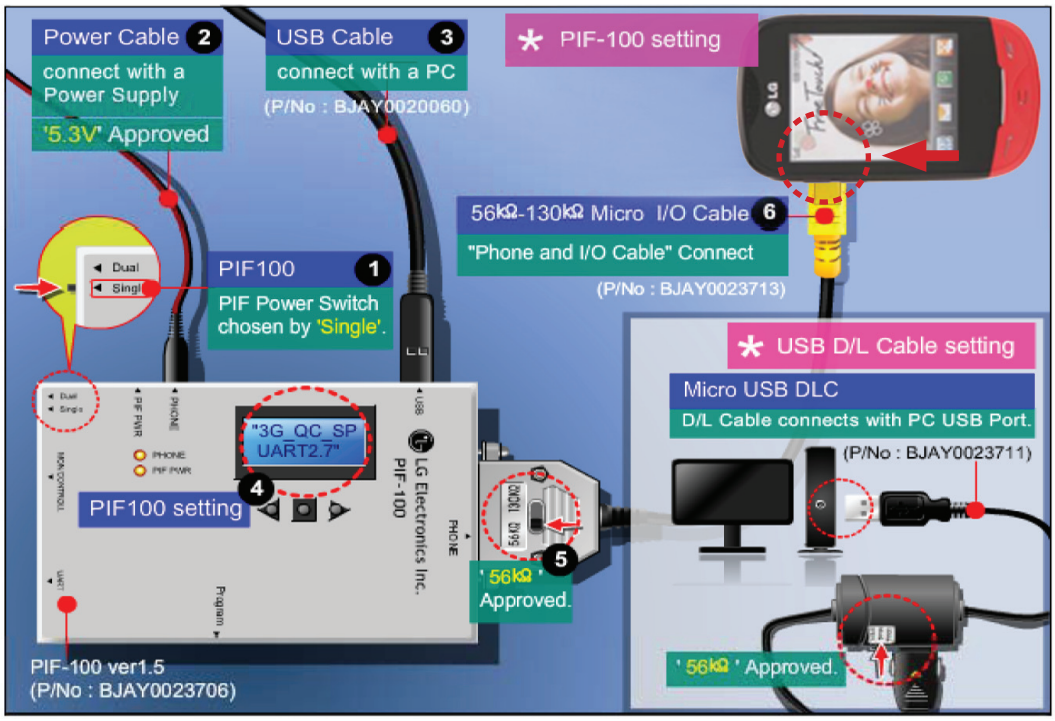


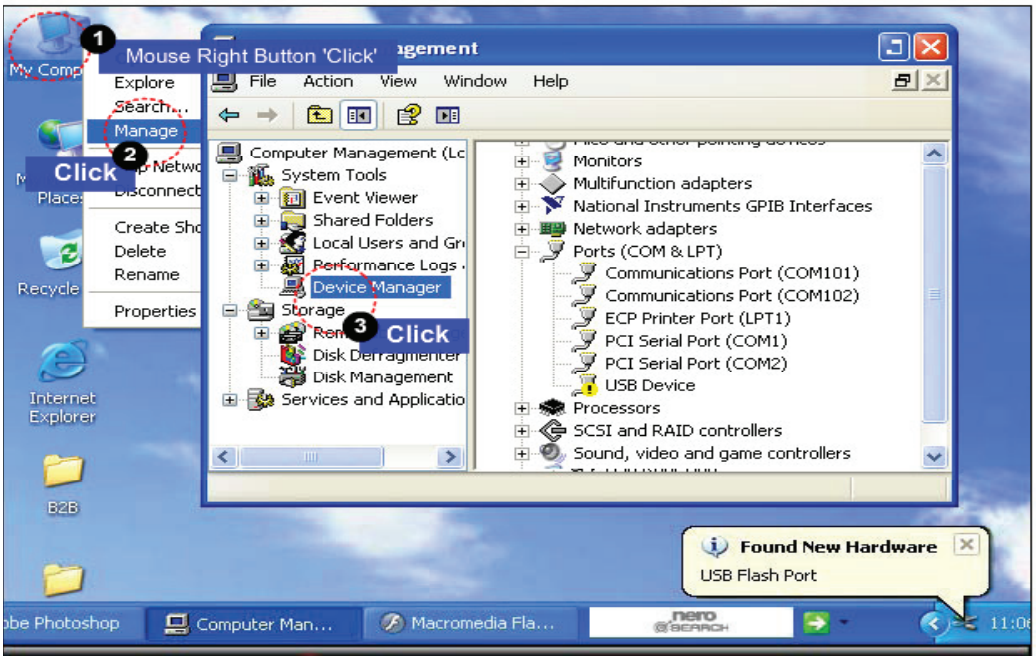


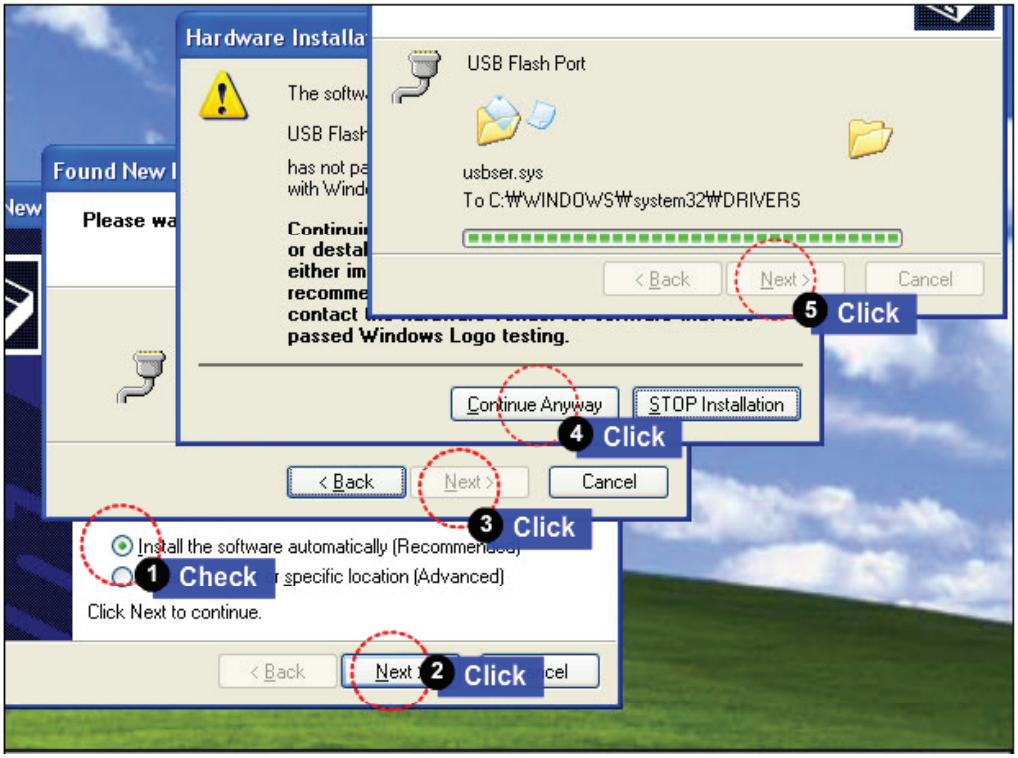


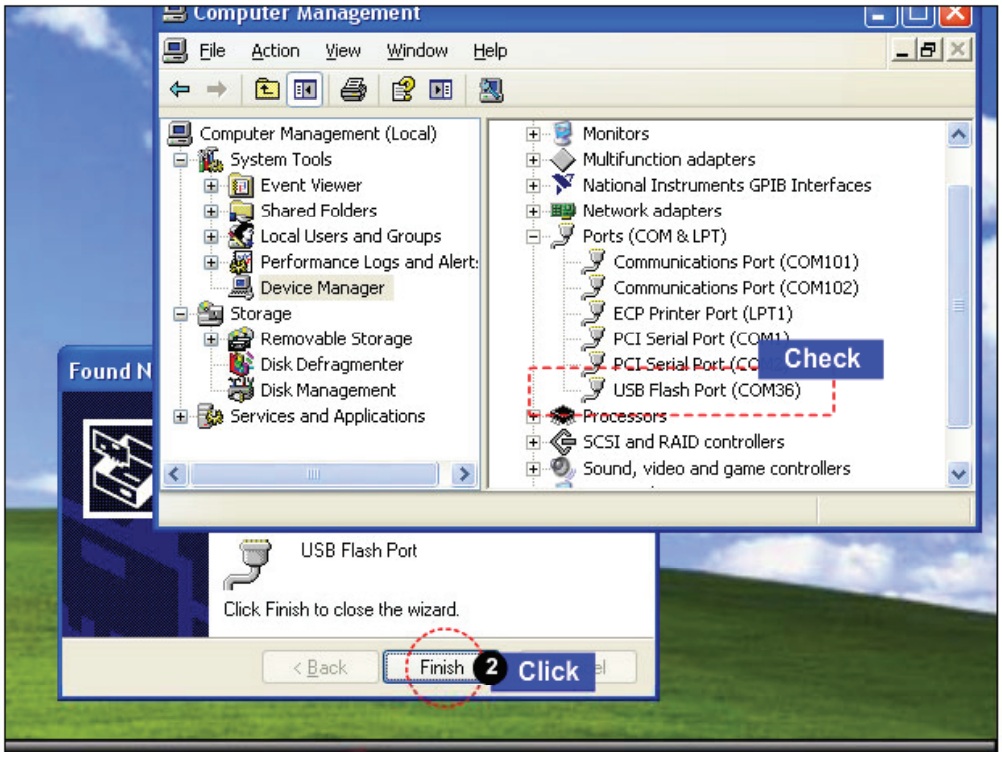


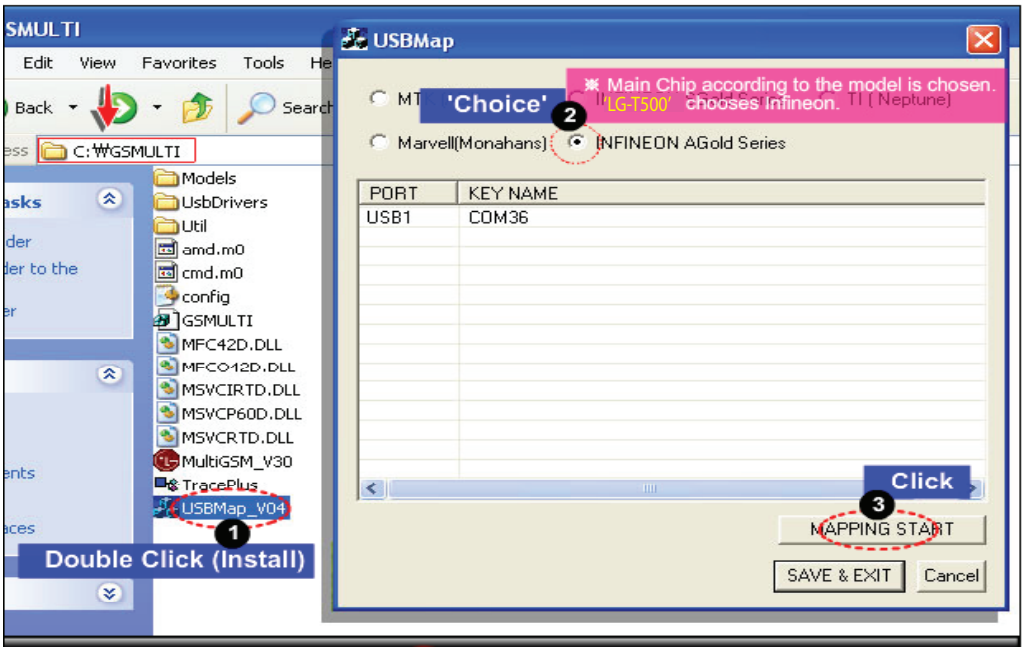


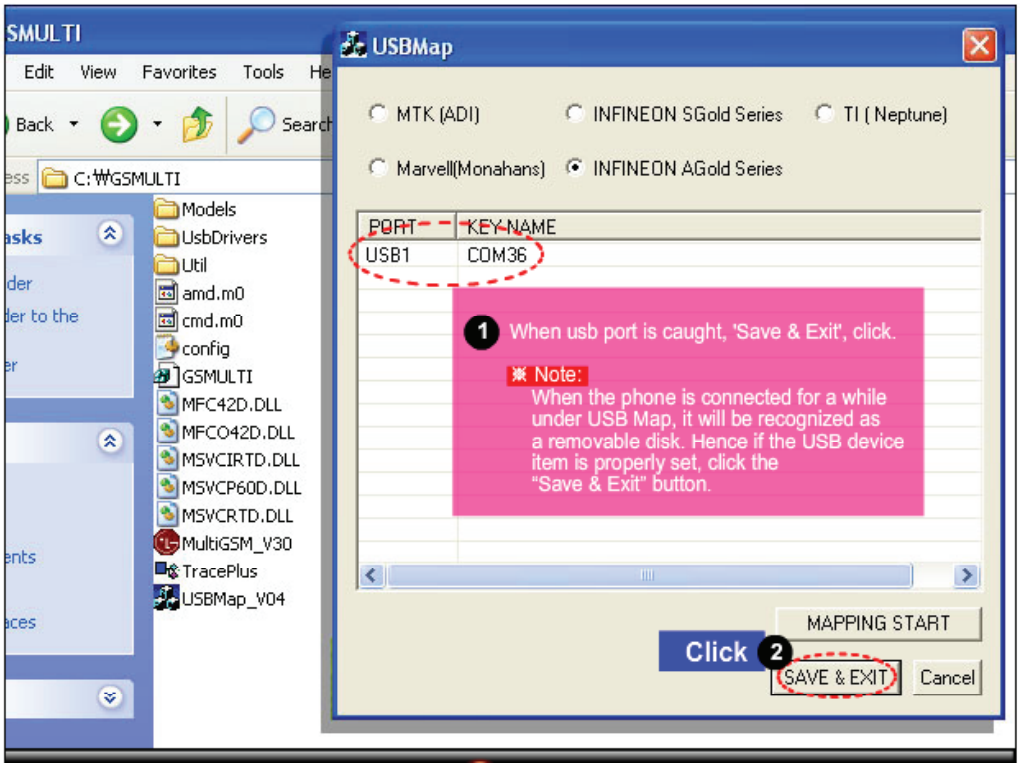


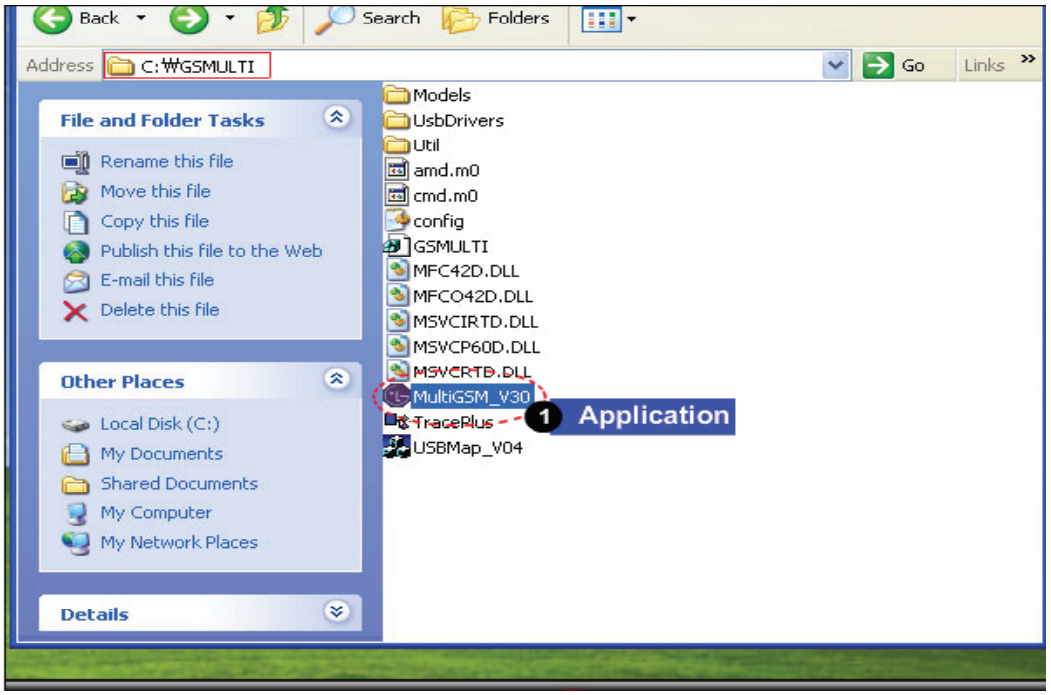


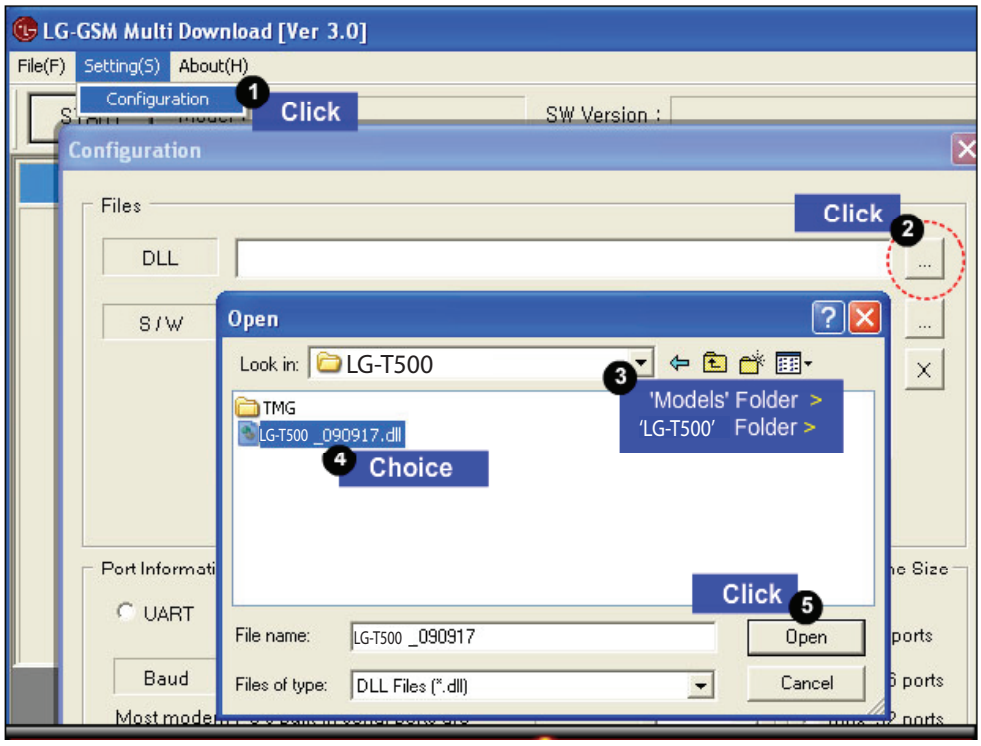


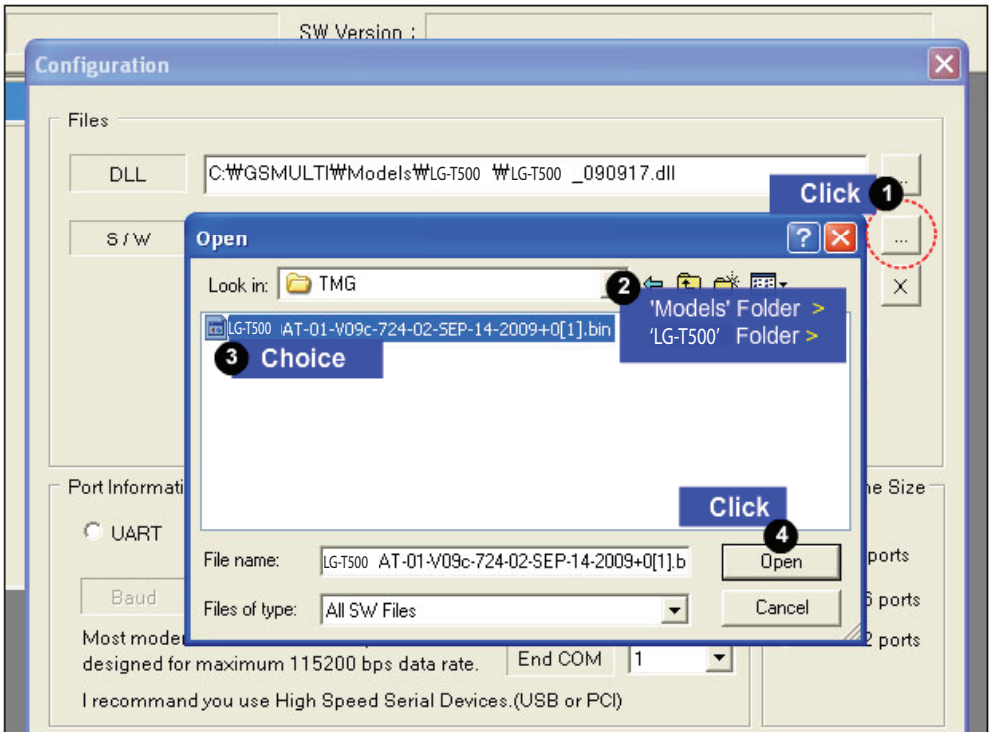


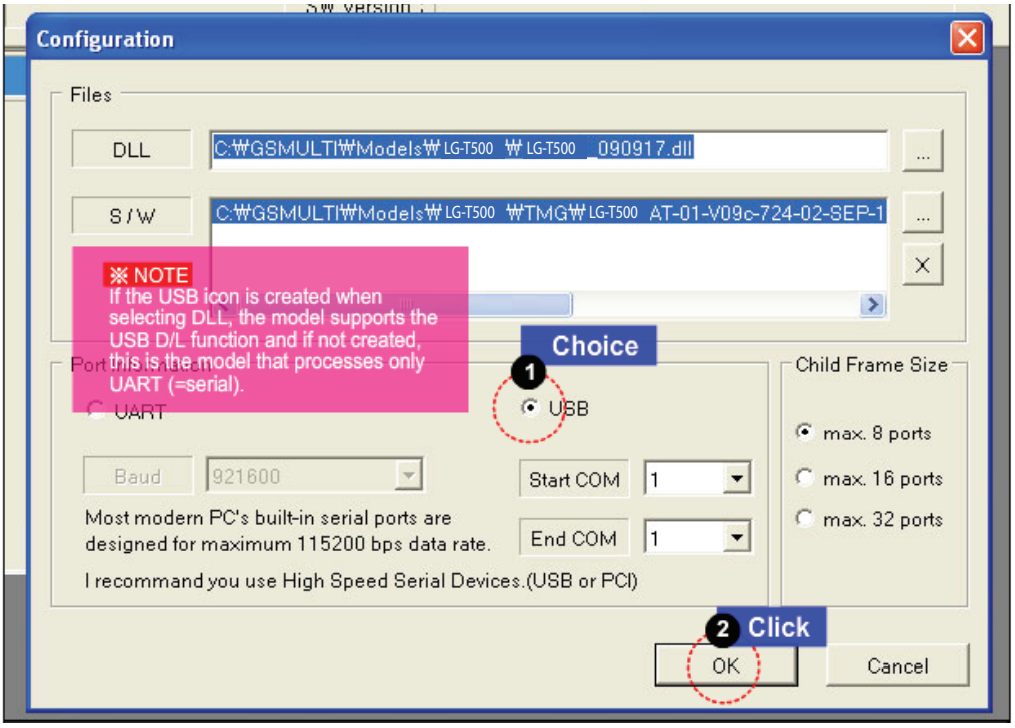


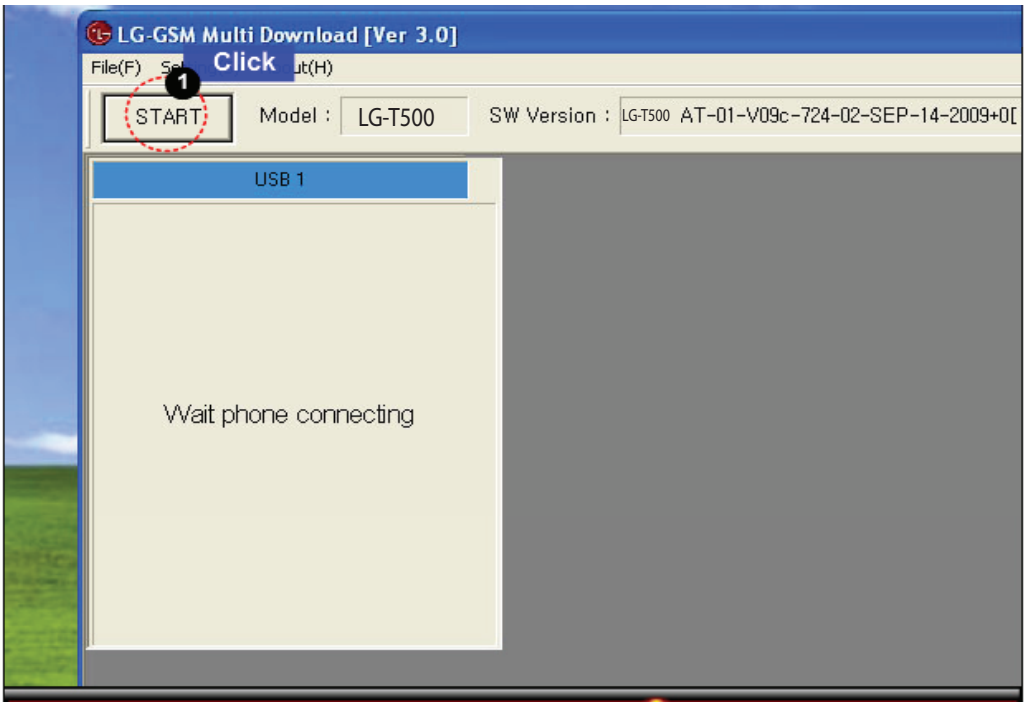


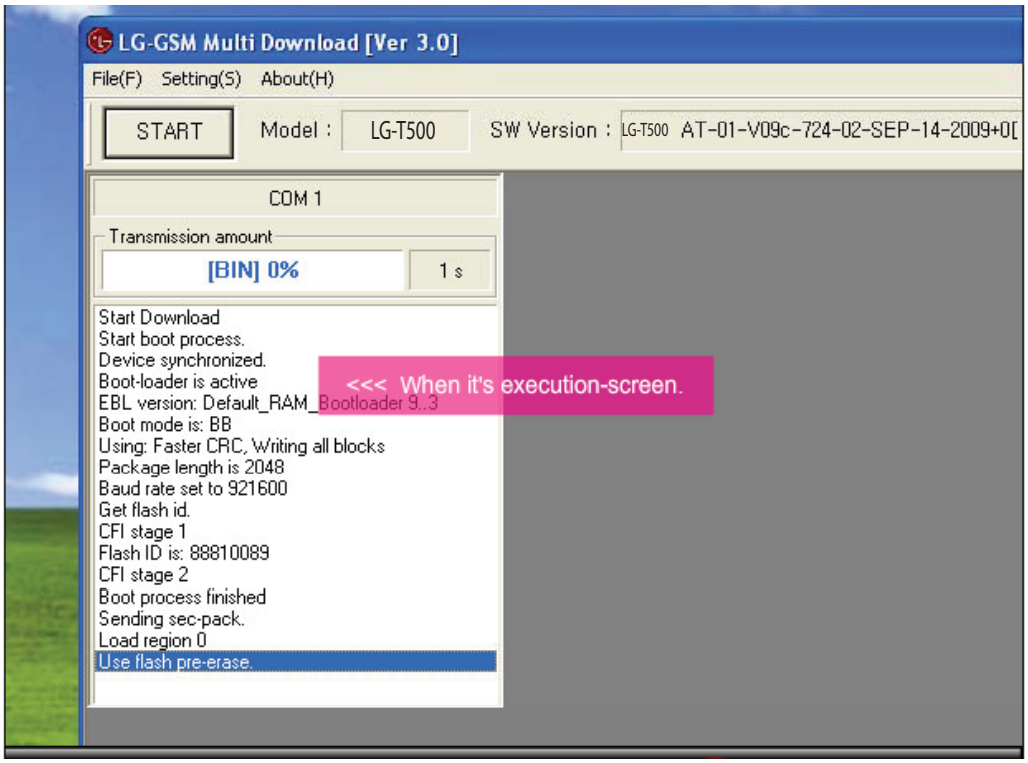


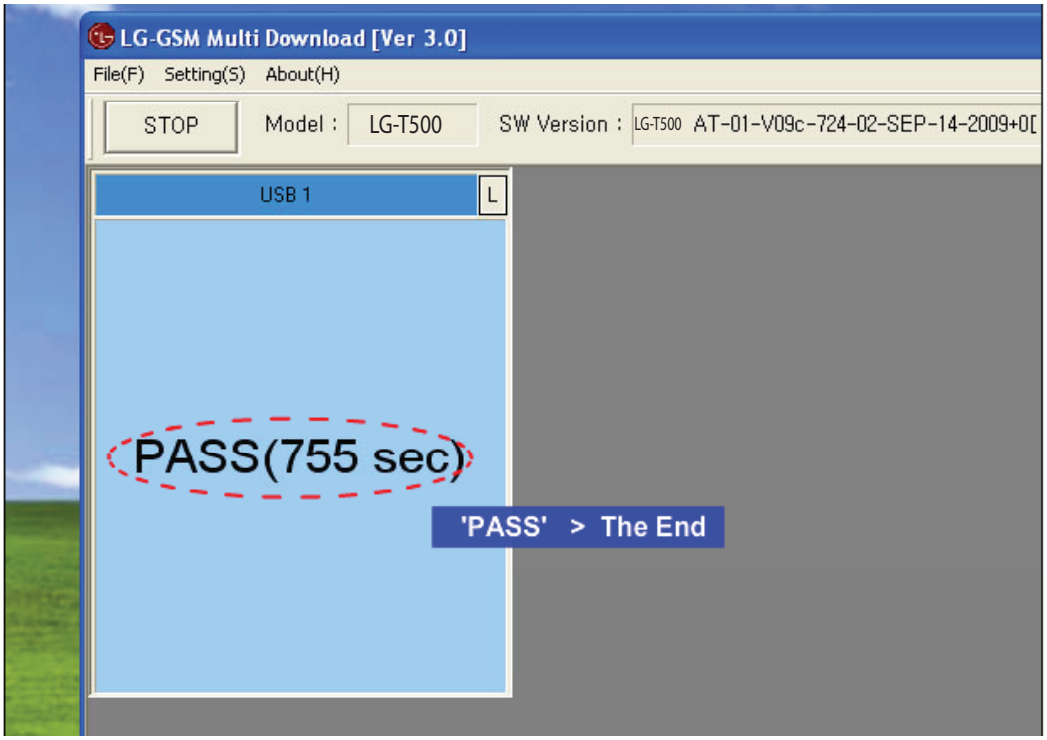




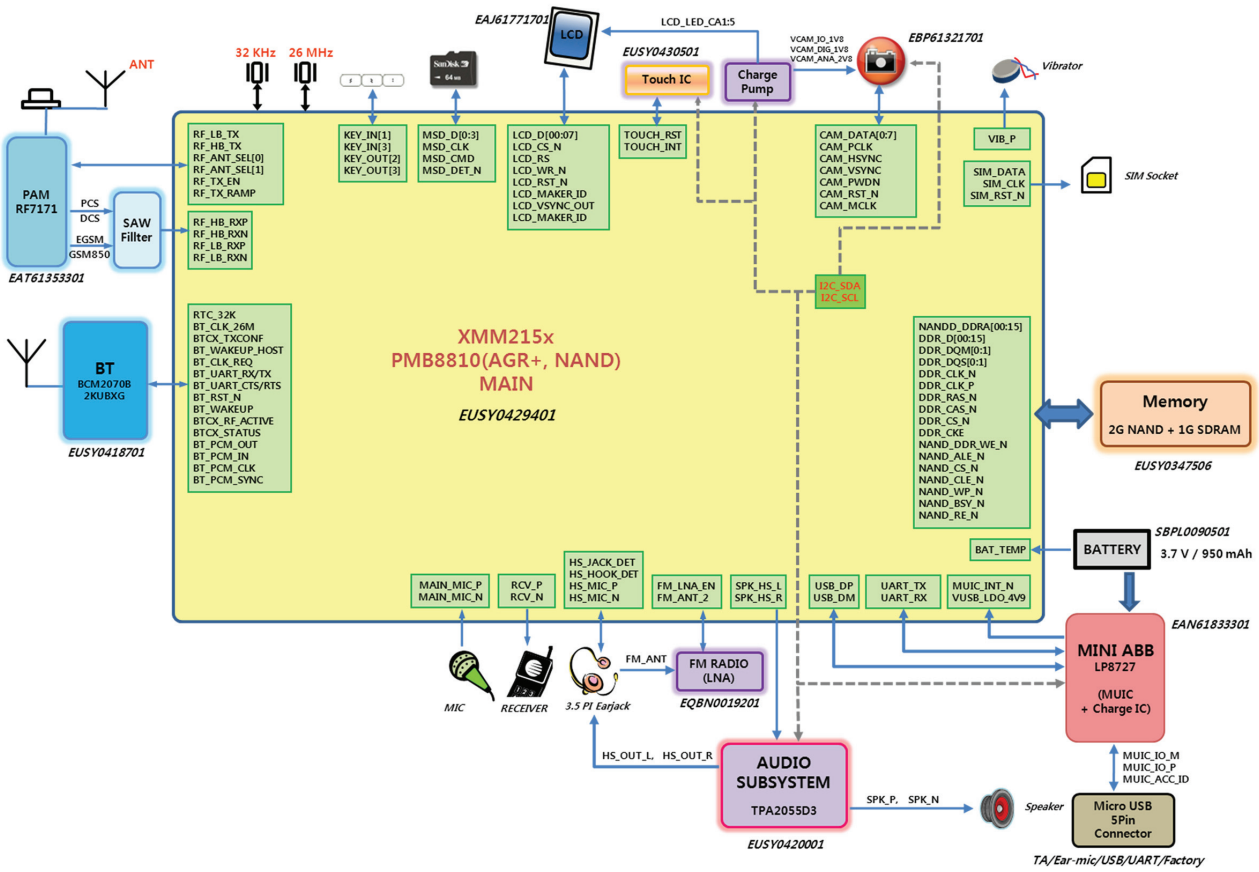








6. BLOCK DIAGRAM



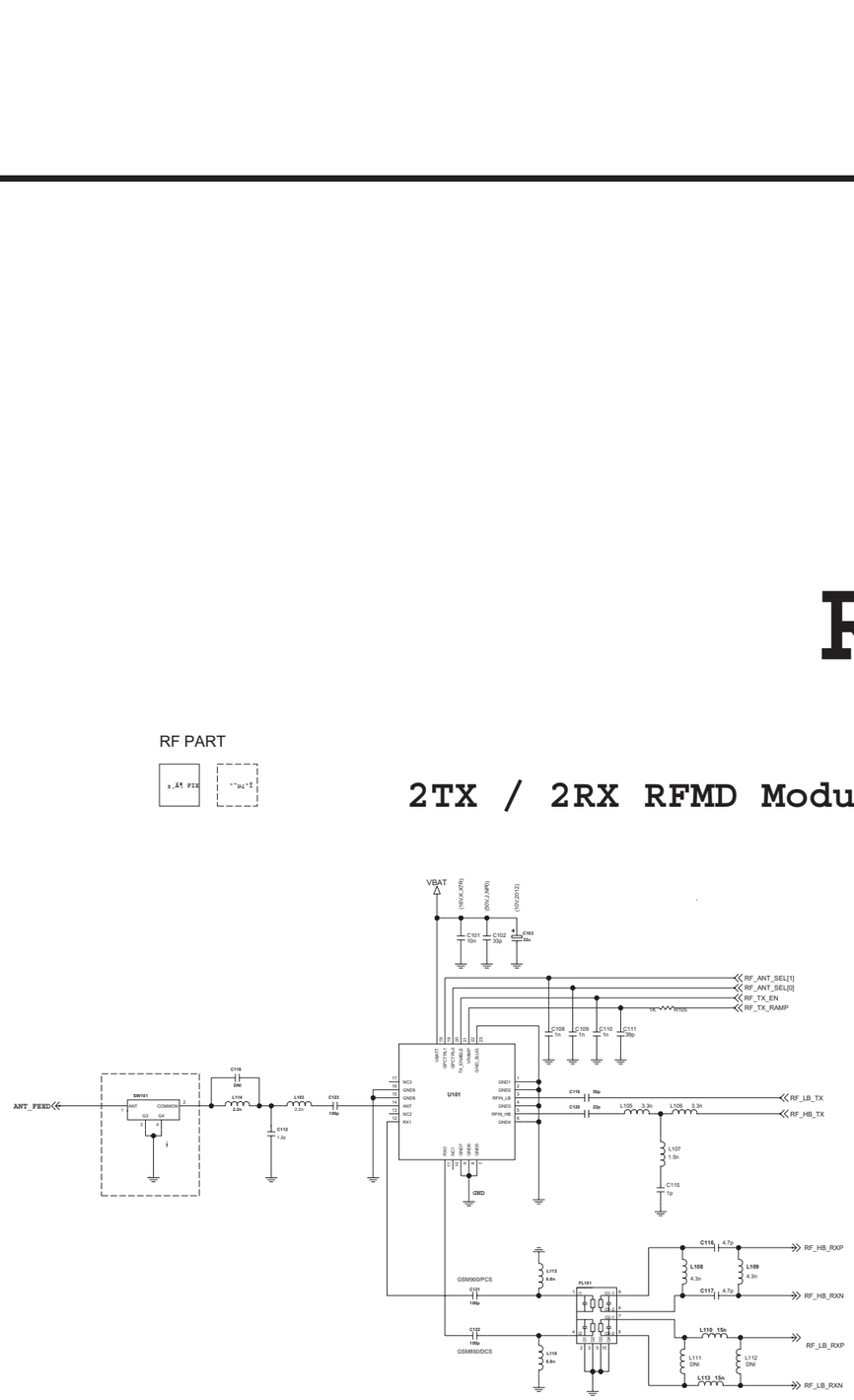
7. CIRCUIT DIAGRAM

RF

RF PART

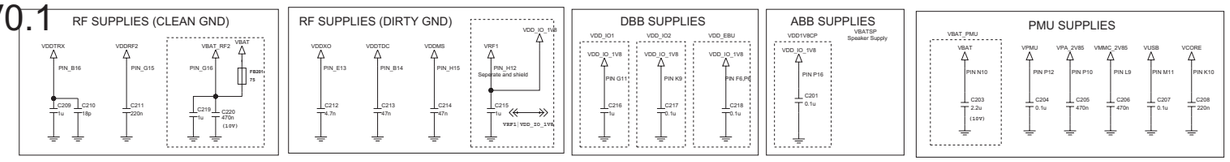
2TX / 2RX RFMD Module

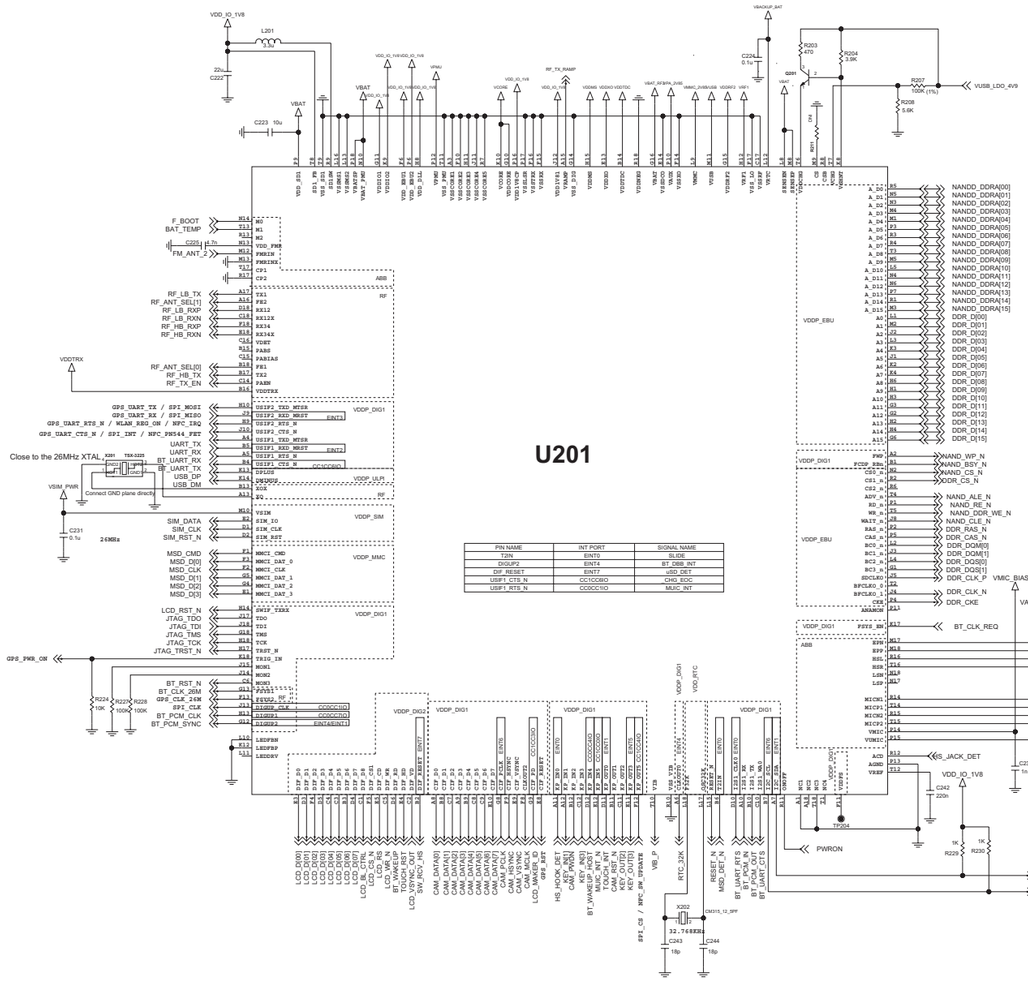
1-0-1-2 ANT_PAD_Ver1.0



MODE	GpCtrl1	GpCtrl0	Tx Enable
STANDBY	LOW	LOW	LOW
RX0	HIGH	LOW	LOW
RX1	HIGH	HIGH	LOW
850/900 TX	HIGH	LOW	HIGH
DCS/PCS TX	HIGH	HIGH	HIGH

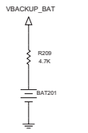
2-5-1-2_IFX_XMM215x_NAND_V0.1

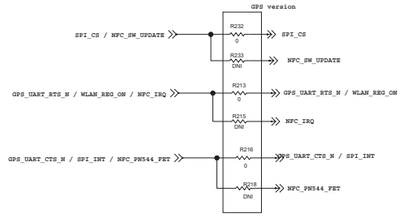




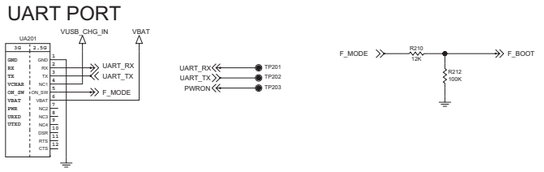
PIN NAME	INT PORT	SIGNAL NAME
T2IN	EINT0	SLIDE
DIGIP2	EINT4	BT_DBB_INT
DIF_RESET	EINT7	uSD_DET
USIF1_CTS_N	CC1CCIO	CHG_EOC
USIF1_RTS_N	CC0CCIO	MUIC_INT

4-6-1-1 Super Cap

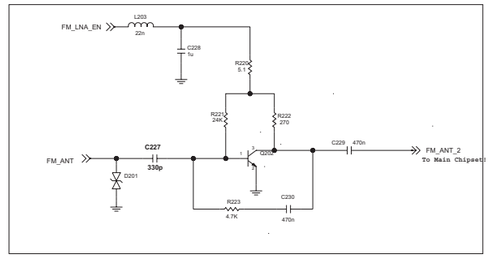


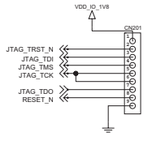


UART PORT

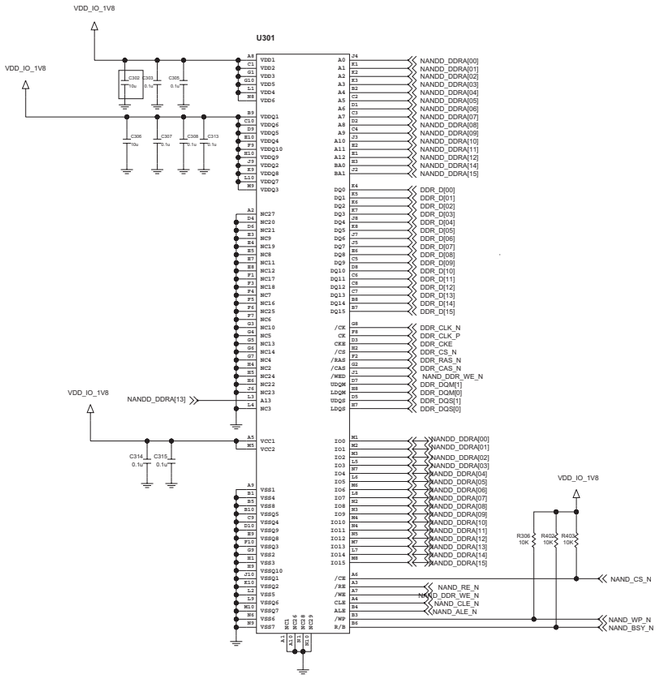


FM Radio(LNA)



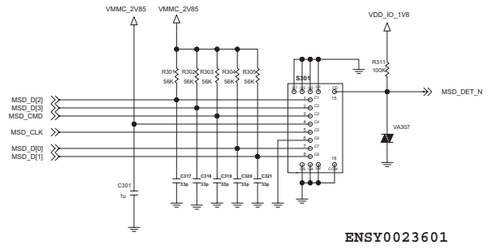


MCP2-1_2G_1G DDRx16_hynix_shrink



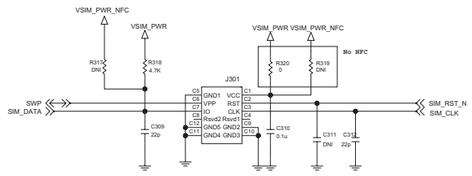
8-3-1-2_Push_168T_Ver1.0

Micro_SD



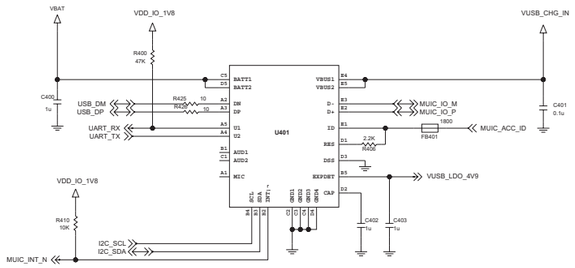
ENSY0023601

SIM_CONNECTOR 1(Default)

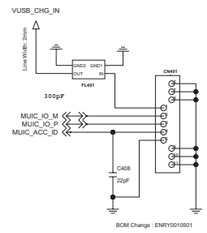


	no NFC	NFC
R319	open	short
R320	short	open

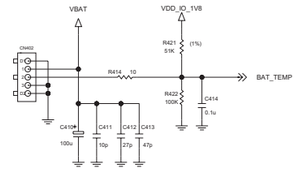
MINI ABB (MUIC + CHARGE ID)



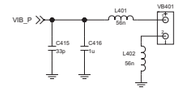
4-2-3-1 Micro-USB 5pin normal



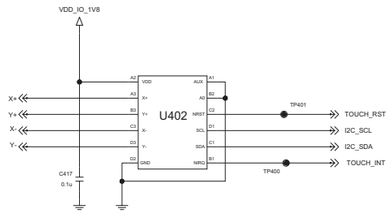
4-5-1-1 Battery Connector



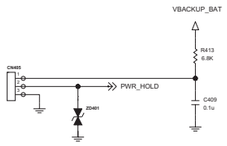
MOTOR



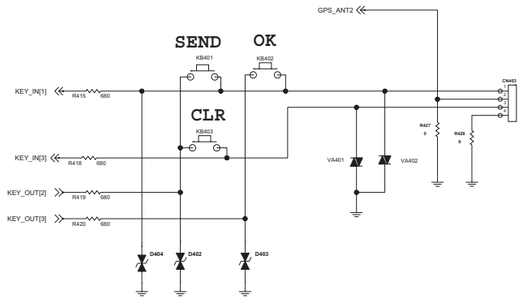
TOUCH IC



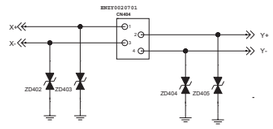
POWER ON



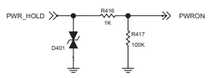
KEYPAD INTERFACE



TOUCH CONNECTOR



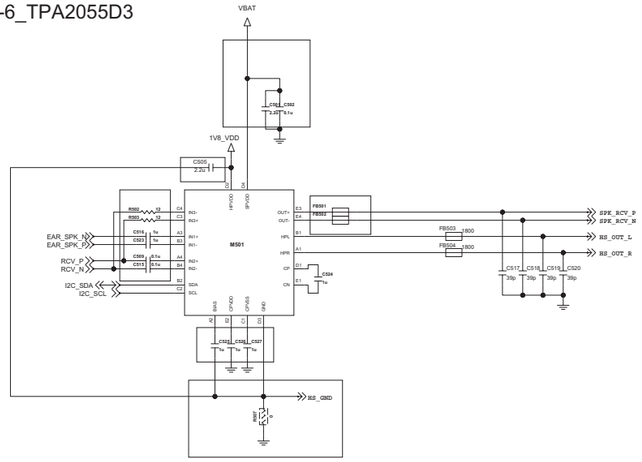
PWR/HOLD



SHIELD CAN

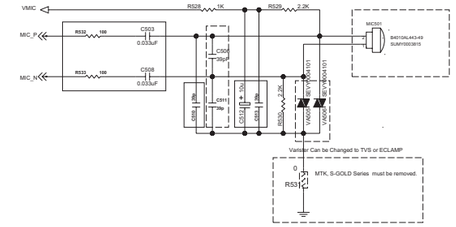
AUDIO SUBSYSTEM

5-1-2-6_TPA2055D3

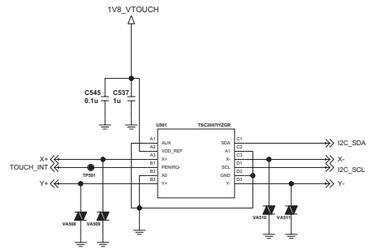


MICROPHONE_C_MIC

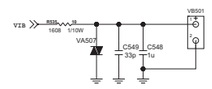
5-2-1-1



TOUCH IC

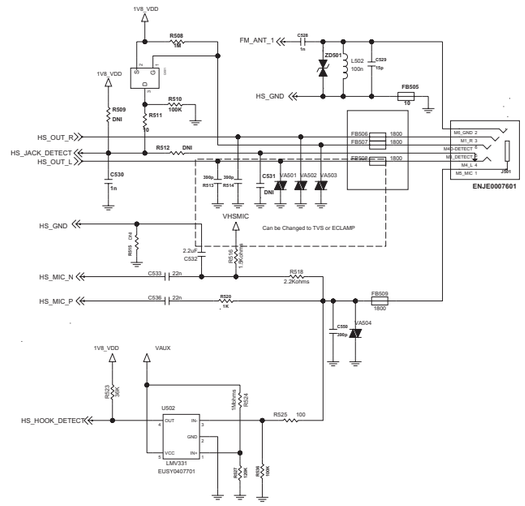


VIBRATOR



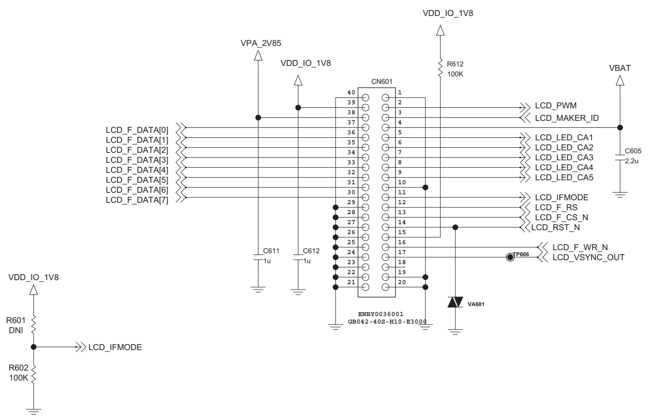
3.5phi HEADSET

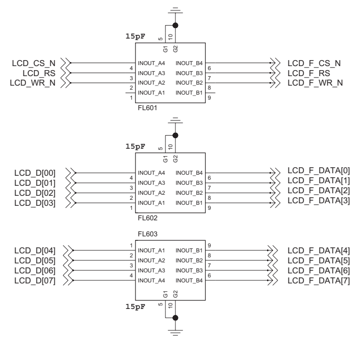
5-3-2-1



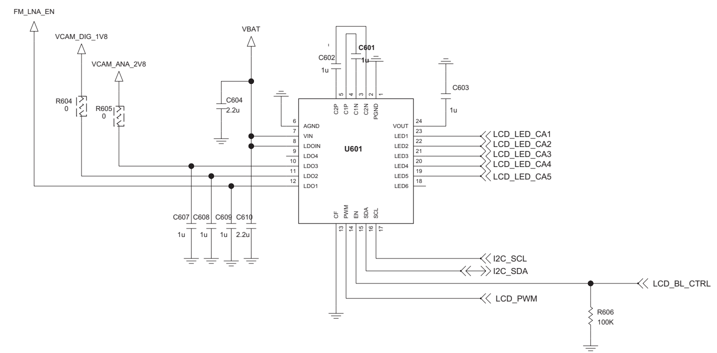
6-1-3-1 40pin_BtoB_Ver1.0

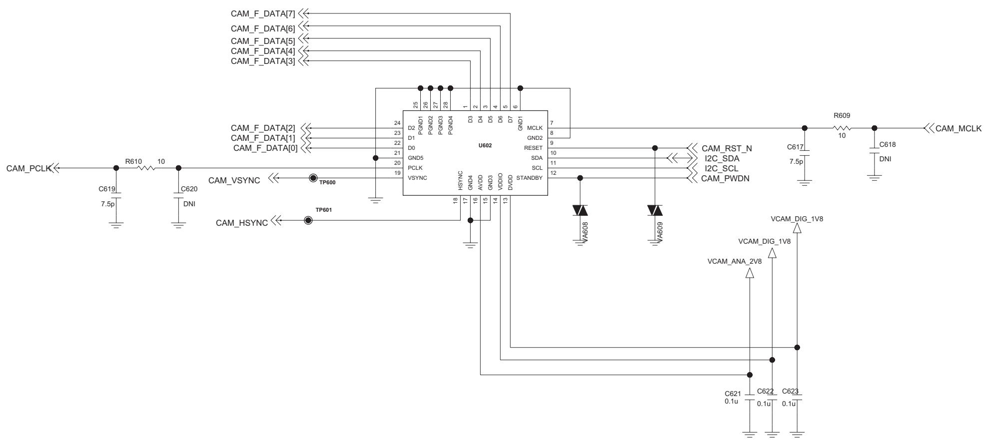
LCD CONNECTOR



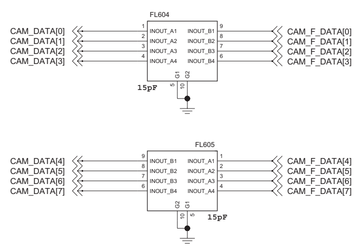


6-3-1-6_6ch_4LDO/RT9396_Ver0.1





EMI FILTER

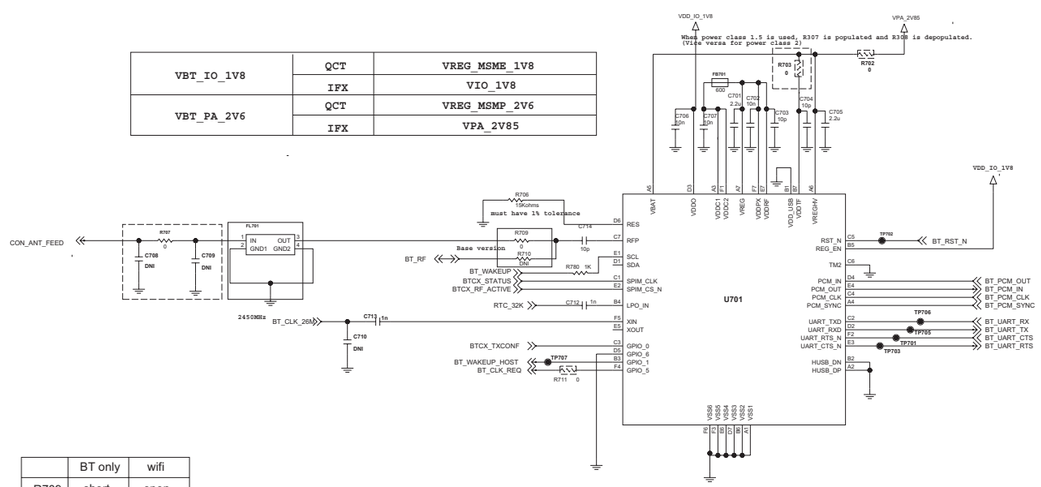


BT

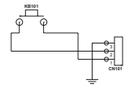
7-1-1-3_BCM2070(QCT & IFX Only)_0.4Pitch

Class 2 or 1.5

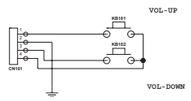
VBT_IO_1V8	QCT	VREG_MSME_1V8
	IFX	VIO_1V8
VBT_PA_2V6	QCT	VREG_MSMP_2V6
	IFX	VPA_2V85



	BT only	wifi
R709	short	open
R710	open	short



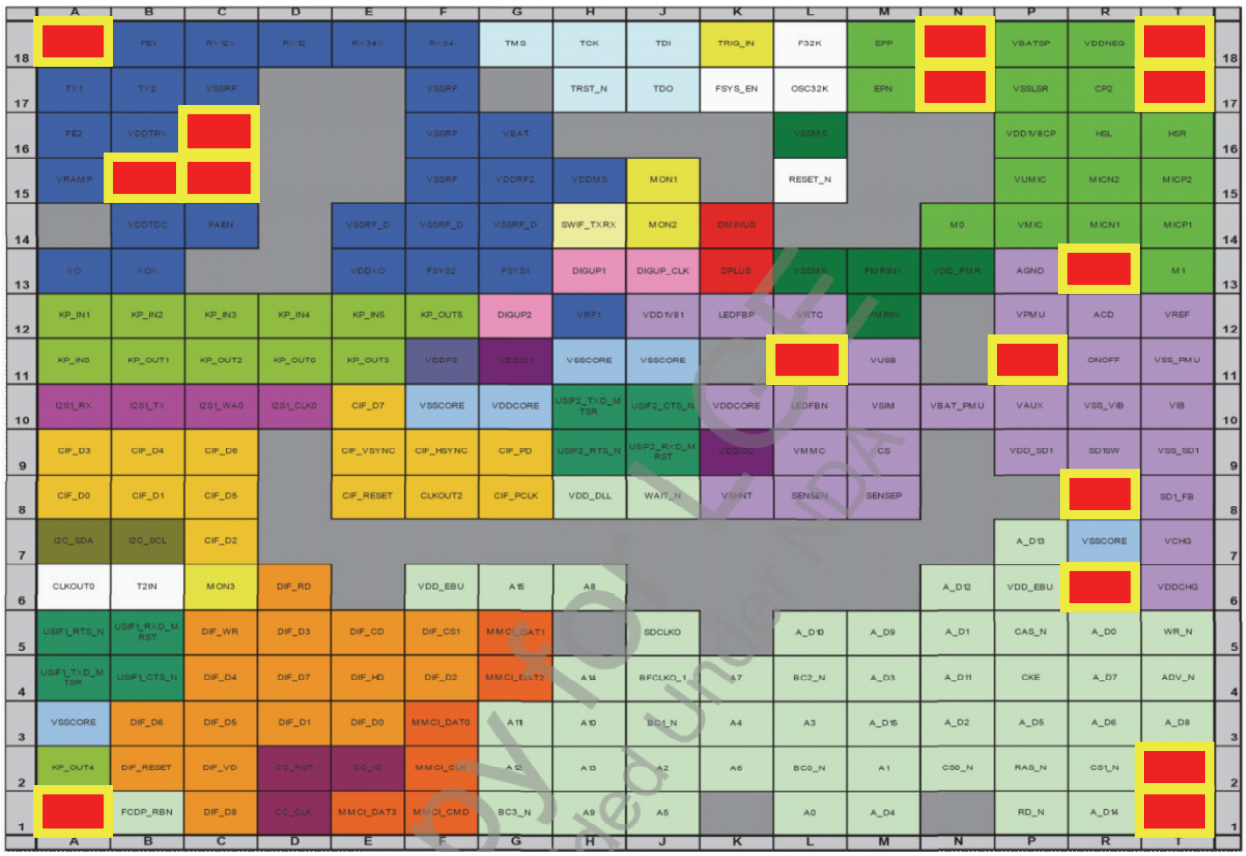
F SK VOL



8. BGA PIN MAP

BGA IC pin check (U201)

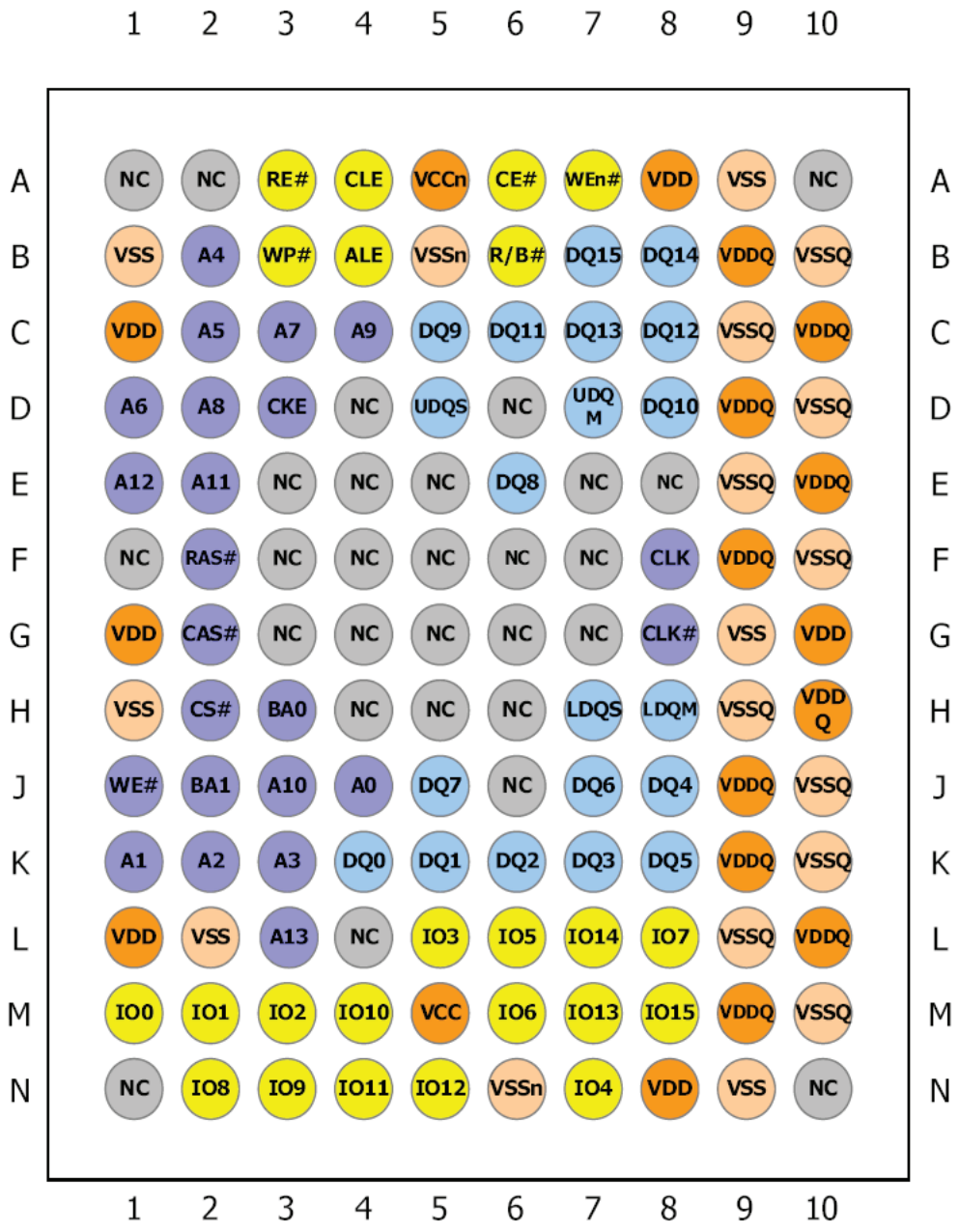
• Ball Diagram (Top View), PMB8815(A-GOLDRADIO+)



: not in use

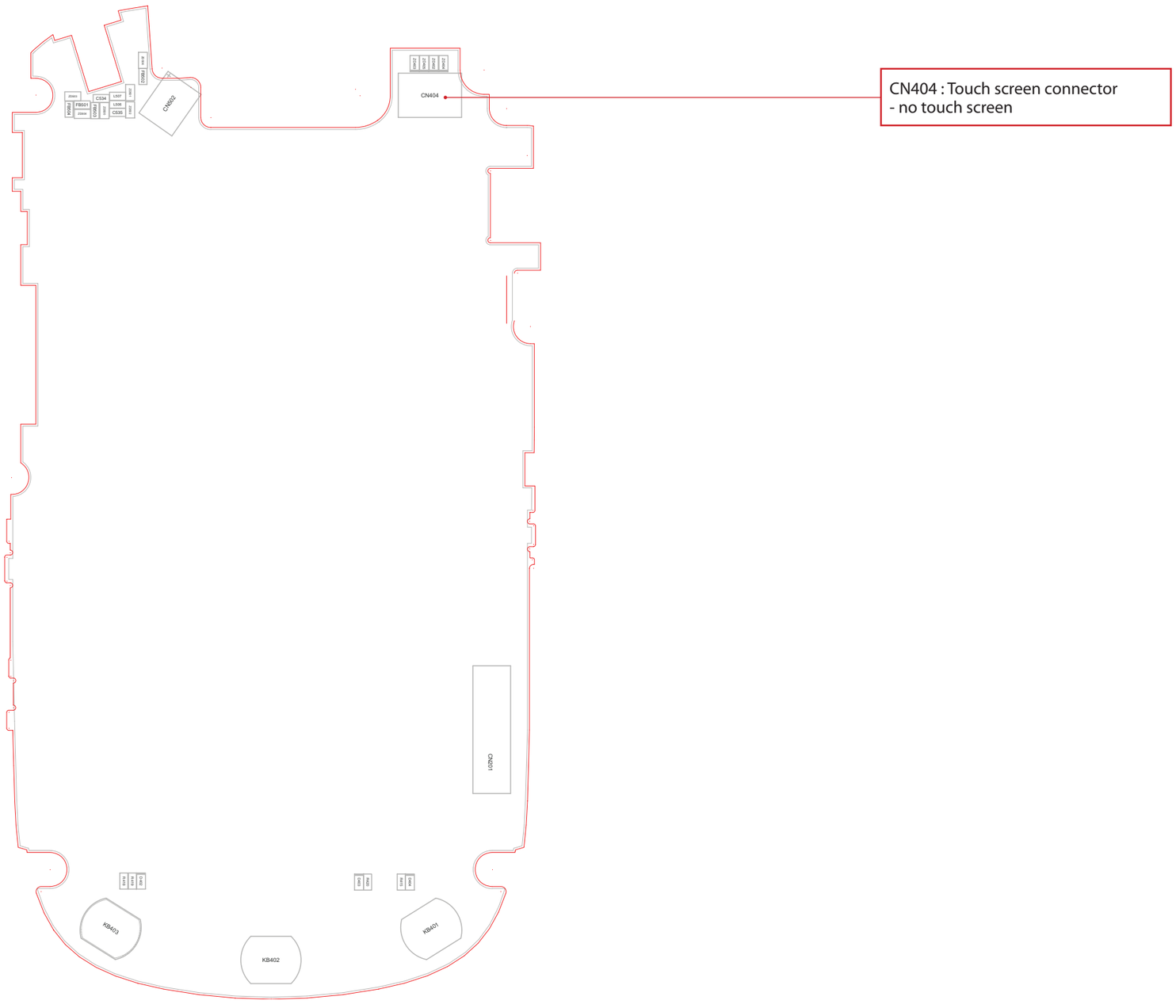
BGA IC pin check (U201)

▪ **Ball Diagram (Top View), H9DA2GH1GHMMMR-46M**



NC **: not in use**

9. PCB LAYOUT



LG-T500_MAIN_EAX64005201_1.0_TOP

U402 : Touch IC
- no touch screen

U401 : MUIC
- no Booting
- no USB/Serial Connection
- no Battery Charge

CN401 : I/O conn.
- no USB Connection.
- no Serial Connection.

CN402 : Battery Conn.
- no power On

BAT201 : BackupCap.
- RTC Reset

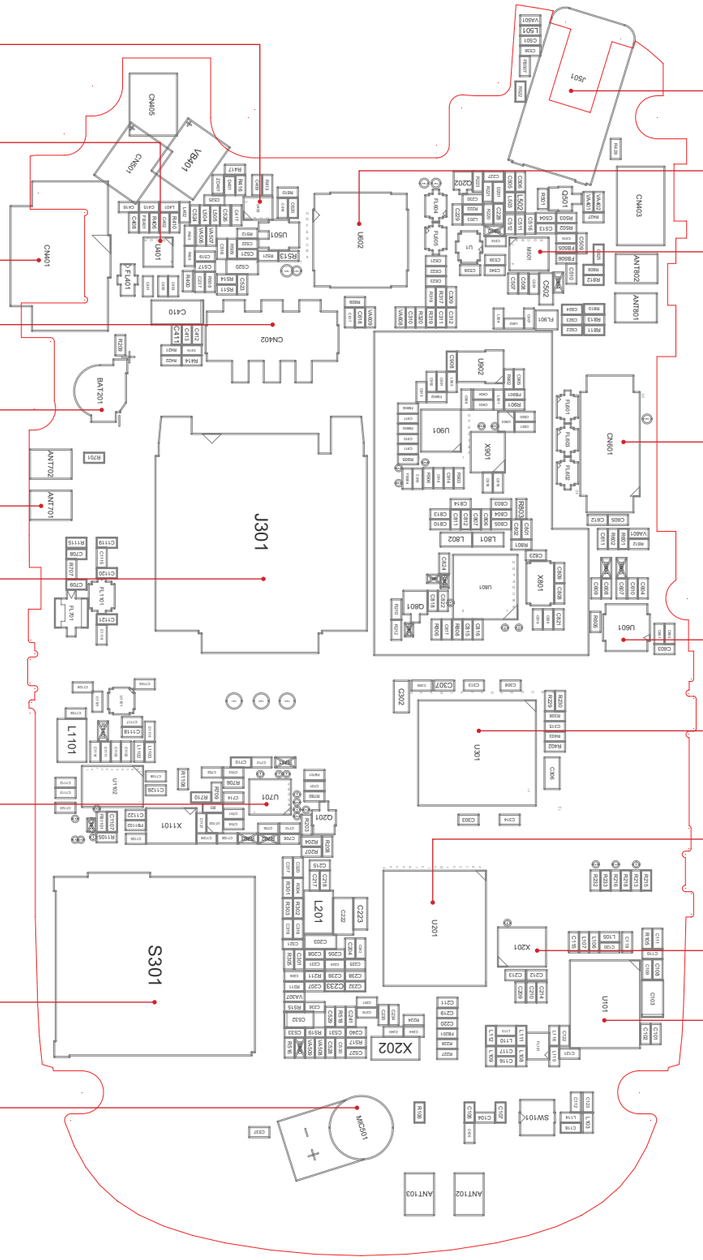
ANT701 : BT Intenna contact
- no BT Connection

J301 : SIM Conn.
- No SIM

U701 : BT Module
- no BT Connection

S301 : T-Flash Socket
- no T-Flash Memory

MIC501 : MAIN MIC
- no voice sending
- no voice recording



J501 : 3.5 pai ear jack
- no Earphone, headset MIC

U602 : 2M Camera Module
- no Camera

M501 : Audio Sub System.
- no Sound

CN601 : LCD Conn.
- no Display

U601 : ChargePump
- no LCD backlight

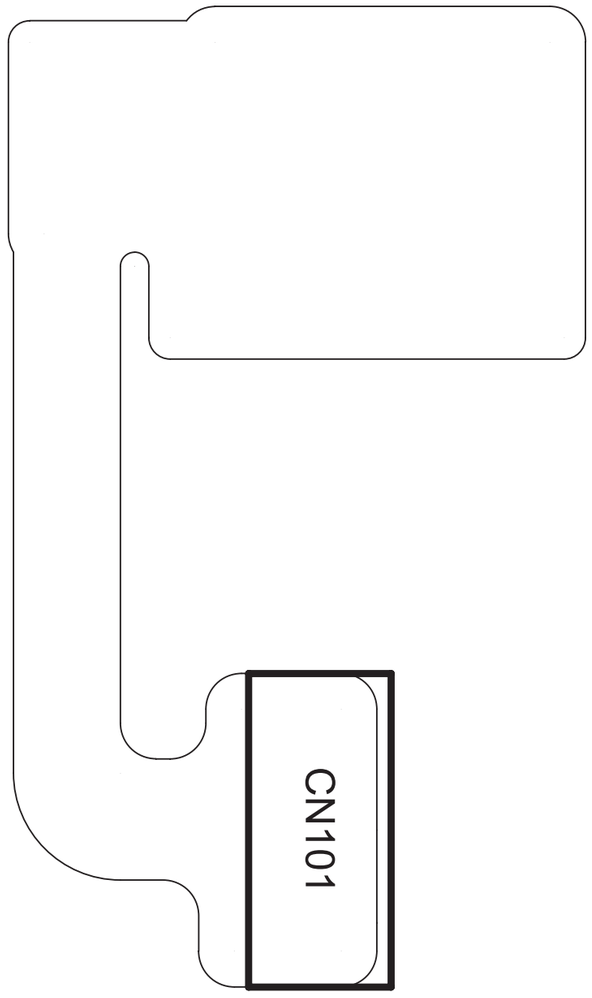
U301 : Memory
- no Booting

U201 : BB IC
- no Power On
- no Servive
- no FM radio

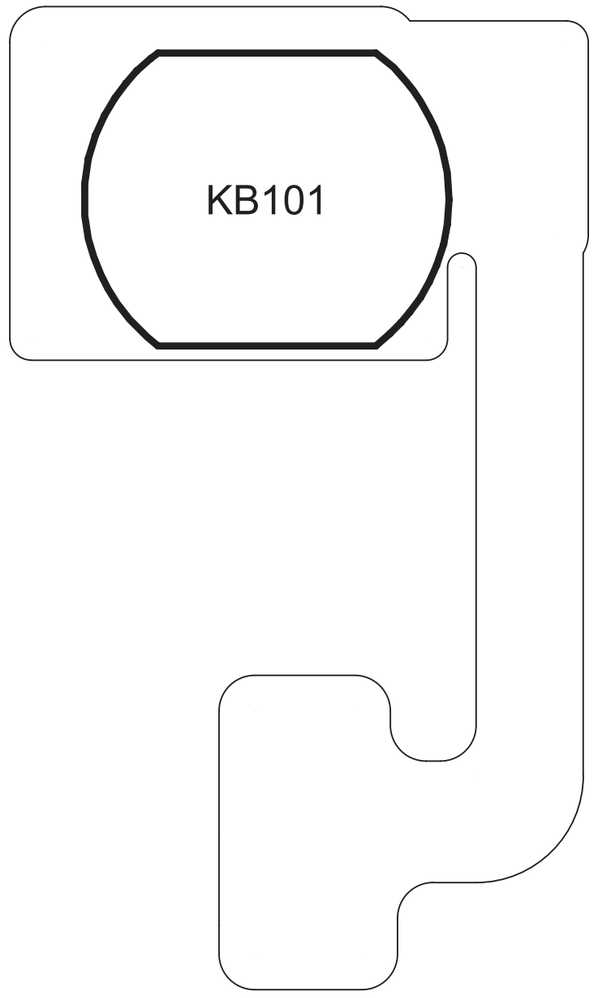
X201 : 26Mhz X-tal
- no Power On
- no Service

U101 : TX Module
- no Service
- RF Sensitivity & TX Power

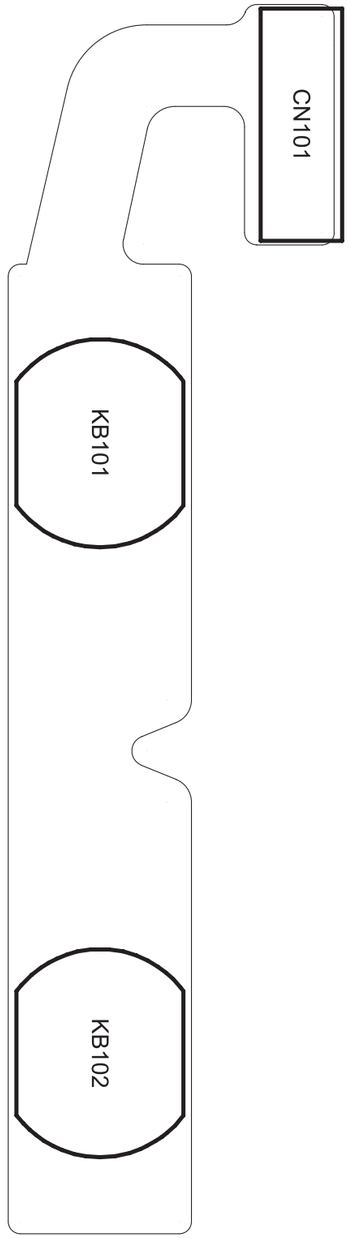
LG-T500_MAIN_EAX64005201_1.0_BOT



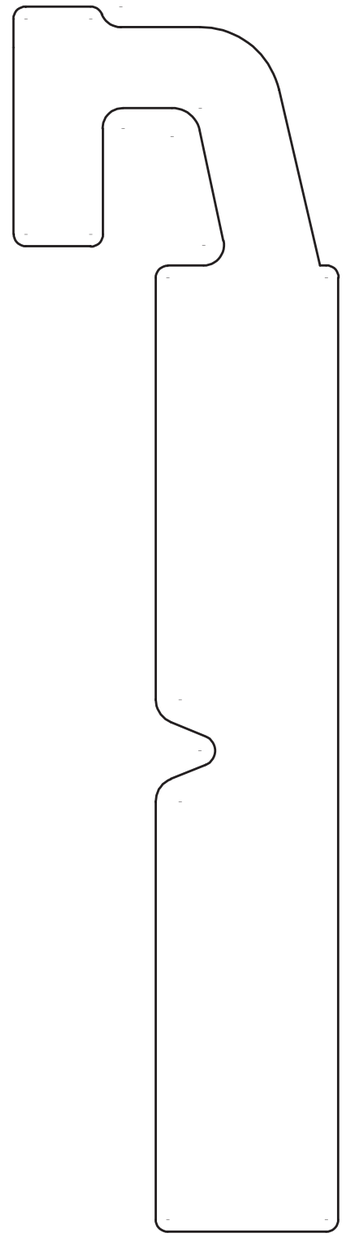
LG-T500_FPCB_F_PWR _1.0_TOP



LG-T500_FPCB_F_PWR _1.0_BOT



LG-T500_FPCB_F_VOL_1.0_TOP



LG-T500_FPCB_F_VOL_1.0_BOT

10.ENGINEERING MODE

Engineering mode is designed to allow a service man/engineer to view and test the basic functions provided by a handset. The key sequence for switching the engineering mode on is "1809#*500# "Select. Pressing END will switch back to non-engineering mode operation. Use Up and Down key to select a menu and press 'select' key to progress the test. Pressing 'back key will switch back to the original test menu.

[1] BB TEST

[1-1] Battery Info

[1-1-1] BattInfo

[1-2] Bluetooth Test

[1-2-1] Enter Test Mode
[1-2-2] OnOff Test
[1-2-3] Headset Test
[1-2-4] BT Test1
[1-2-5] BT Test2
[1-2-6] Xhtml Compose Print
[1-2-7] Xhtml Print Test

[2] Model Version

[2-1] Version

[3] Eng Mode

[3-1] Cell environ.

[3-2] PS Layer Info

[3-2-1] Mobility
[3-2-2] RadioRes
[3-2-1] Gprs

[3-3] Layer1 Info

[3-4] Reset Information

[3-5] Memory Configurarion

[3-6] MemGenConf

[3-7] MemAllUse

[3-8] MemDetUse

[3-9] MemDump

[3-10] Change Frequency Band

[4] Call Timer

[5] Factory Reset

[6] MF TEST

[6-1] All Auto Test

[6-2] Backlight

[6-2-1] BacklightOn
[6-2-2] BacklightOff

[6-3] Audio

[6-3-1] Audio Test

[6-4] Vibrator

[6-4-1] VibratorOn
[6-4-2] VibratorOff

[6-5] LCD

[6-5-1] Auto LCD

[6-6] Key pad

[6-7] Mic Speaker

[6-8] Camera

[6-8-1] Camera Main Preview
[6-8-2] FlashOn
[6-8-3] FlashOff
[6-8-4] CameraFlashBunning

[6-9] FM Radio

[6-9-1] FM Radio Test

[7] Network selection

[7-1] Automatic

[7-2] GSM850

[7-3] EGSM

[7-4] DCS

[7-5] PCS

11. STAND ALONE TEST

11.1 Introduction

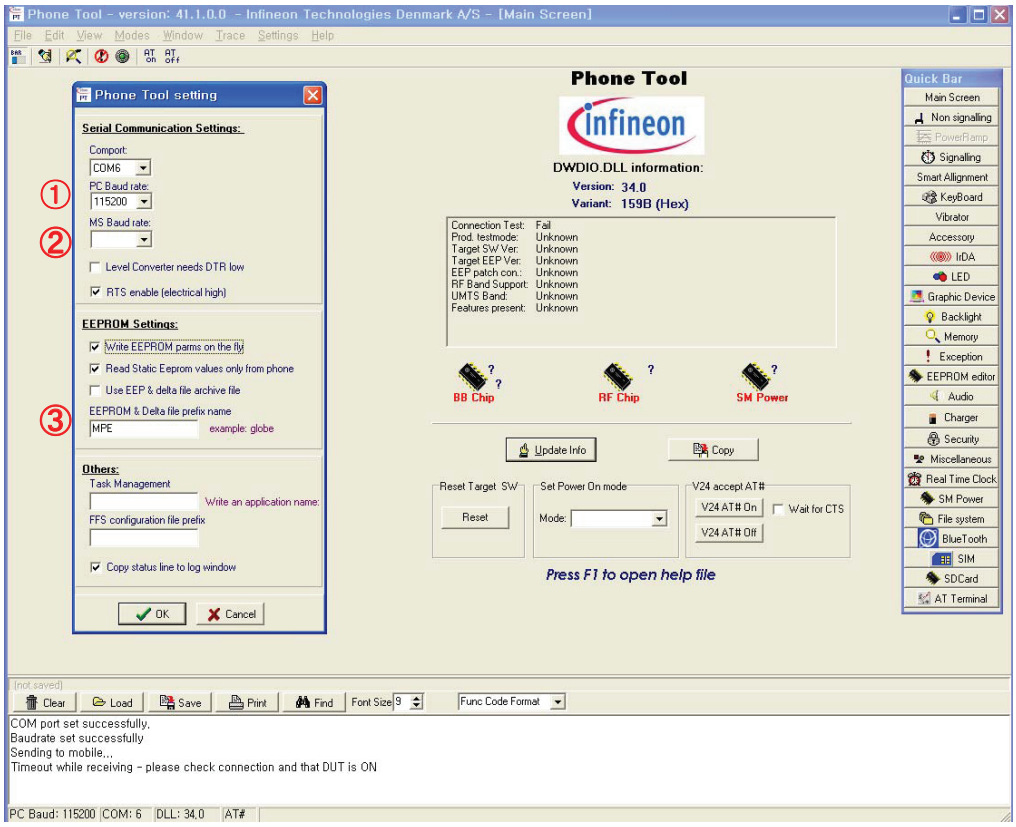
This manual explains how to examine the status of RX and TX of the model.

A. Tx Test
TX test - this is to see if the transmitter of the phones is activating normally.

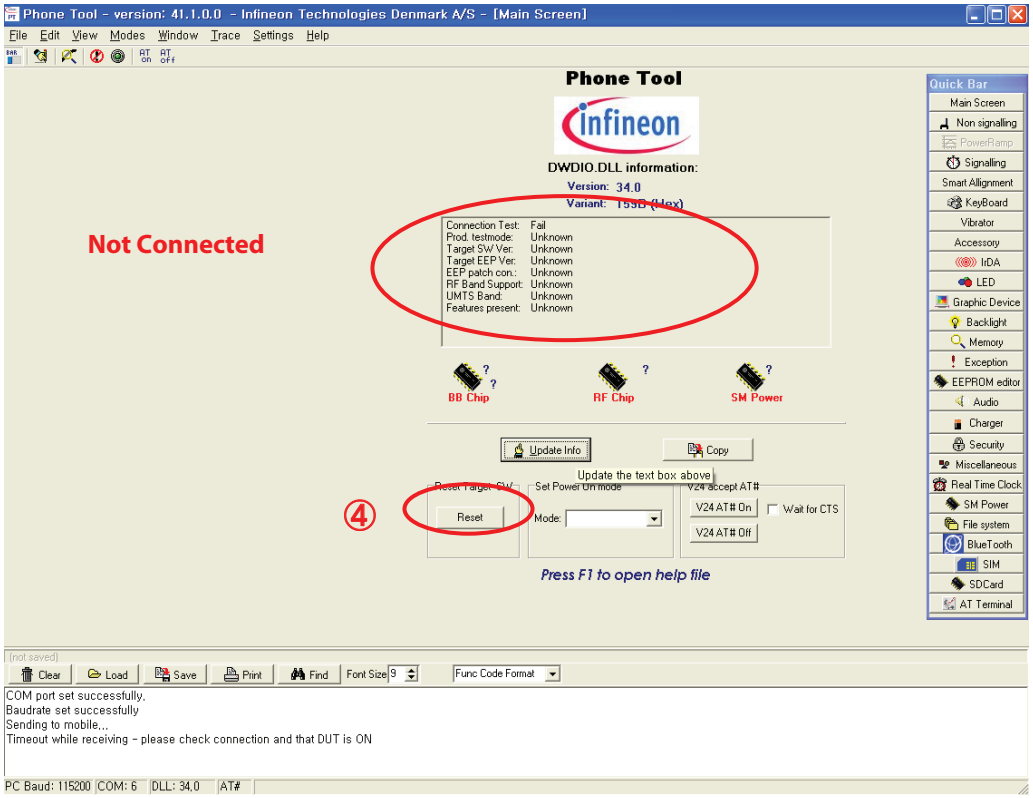
B. Rx Test
RX test - this is to see if the receiver of the phones is activating normally.

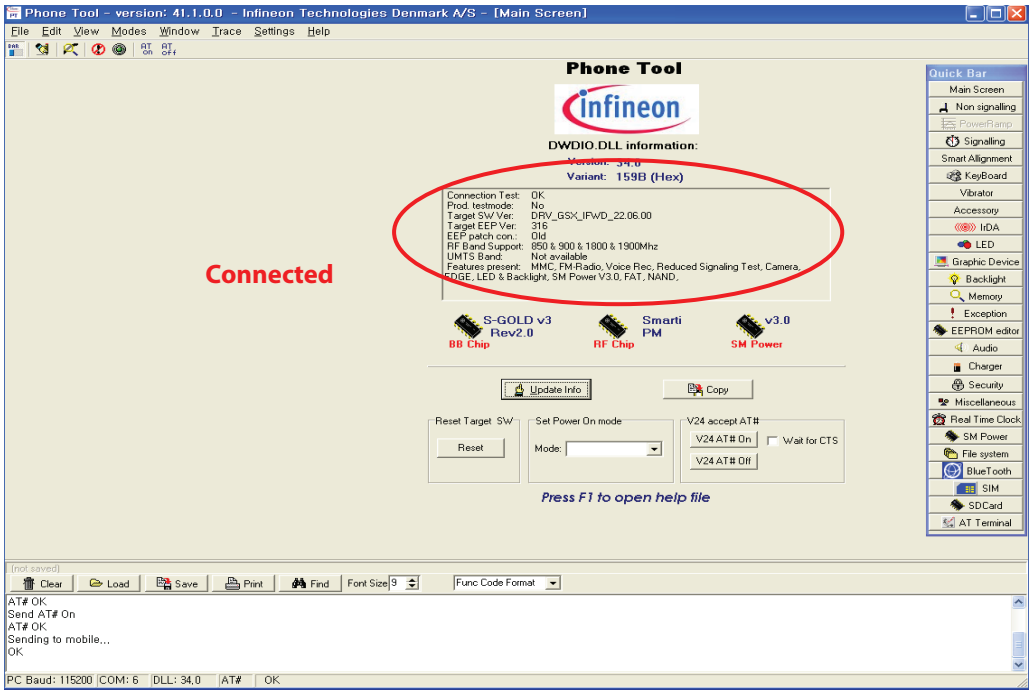
11.2 Setting Method

1. Set COM Port
2. Check PC Bau Rate
3. Confirm EEPROM & Delta file prefix name

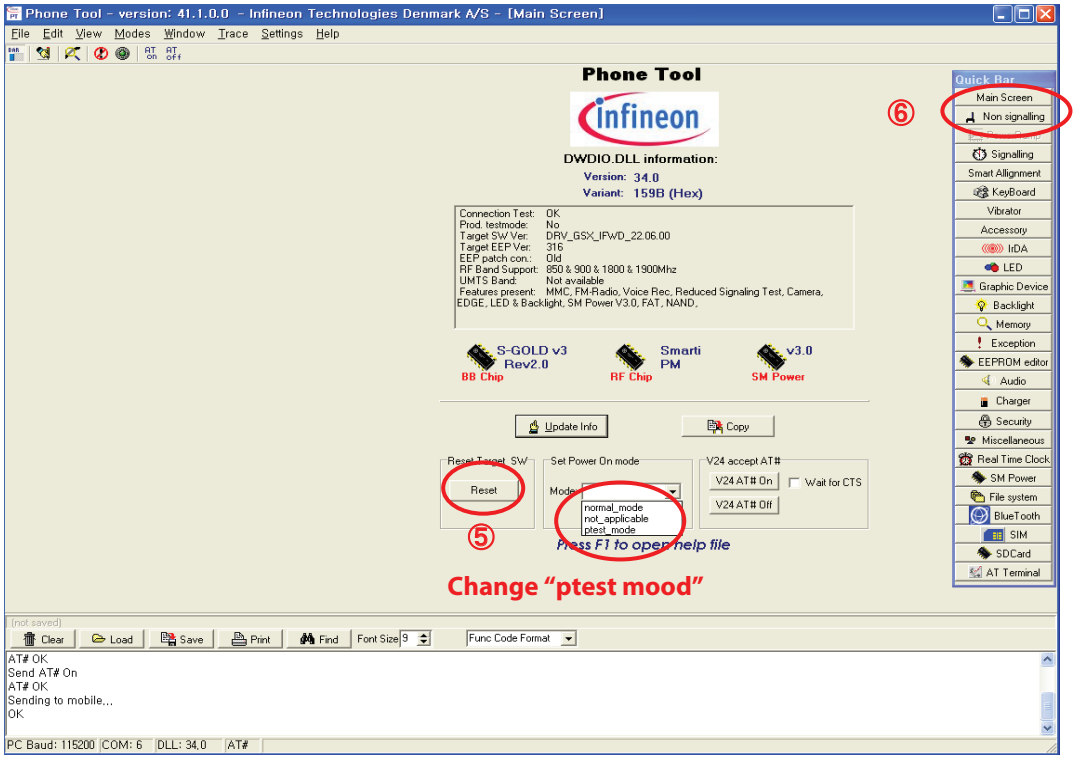


4. Click “Update Info” for communicating Phone and Test-Program



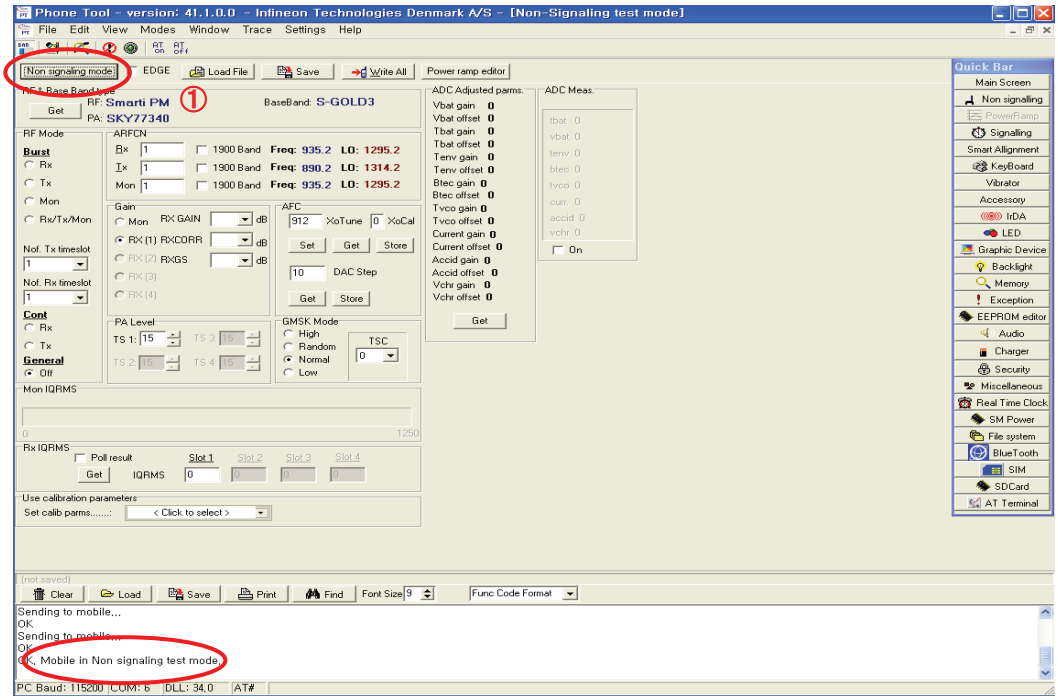


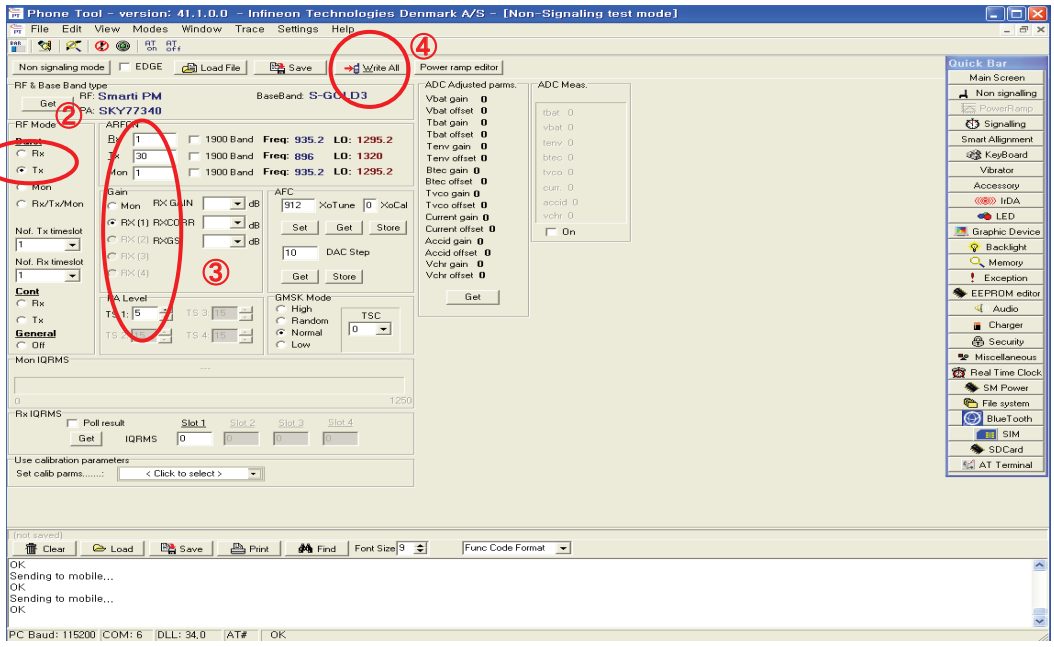
5. For the purpose of the Standalone Test, Change the Phone to “ptest mode” and then Click the “Reset” bar.
6. Select “Non signaling” in the Quick Bar menu. Then Standalone Test setup is finished.



11.3 Tx Test

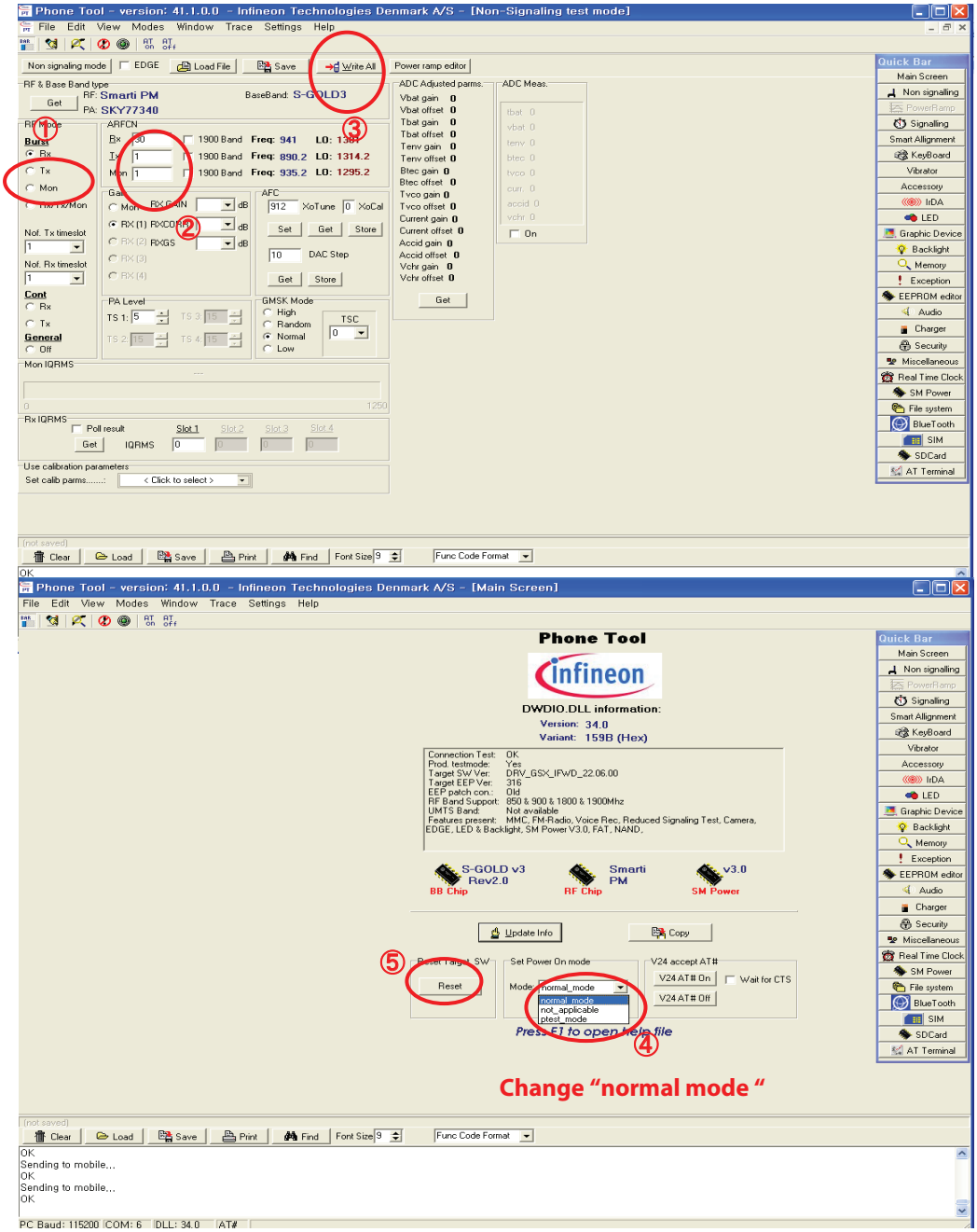
1. “Non signaling mode” bar and then confirm “OK” text in the command line.
2. Put the number of TX Channel in the ARFCN
3. Select “Tx” in the RF mode menu and “PCL” in the PA Level menu.
4. Finally, Click “Write All” bar and try the efficiency test of Phone.





11.4 Rx Test

1. Put the number of RX Channel in the ARFCN.
2. Select “Rx” in the RF mode menu.
3. Finally, Click “Write All” bar and try the efficiency test of Phone.
4. The Phone must be changed “normal mode” after finishing Test.
5. Change the Phone to “normal mode” and then Click the “Reset” bar.

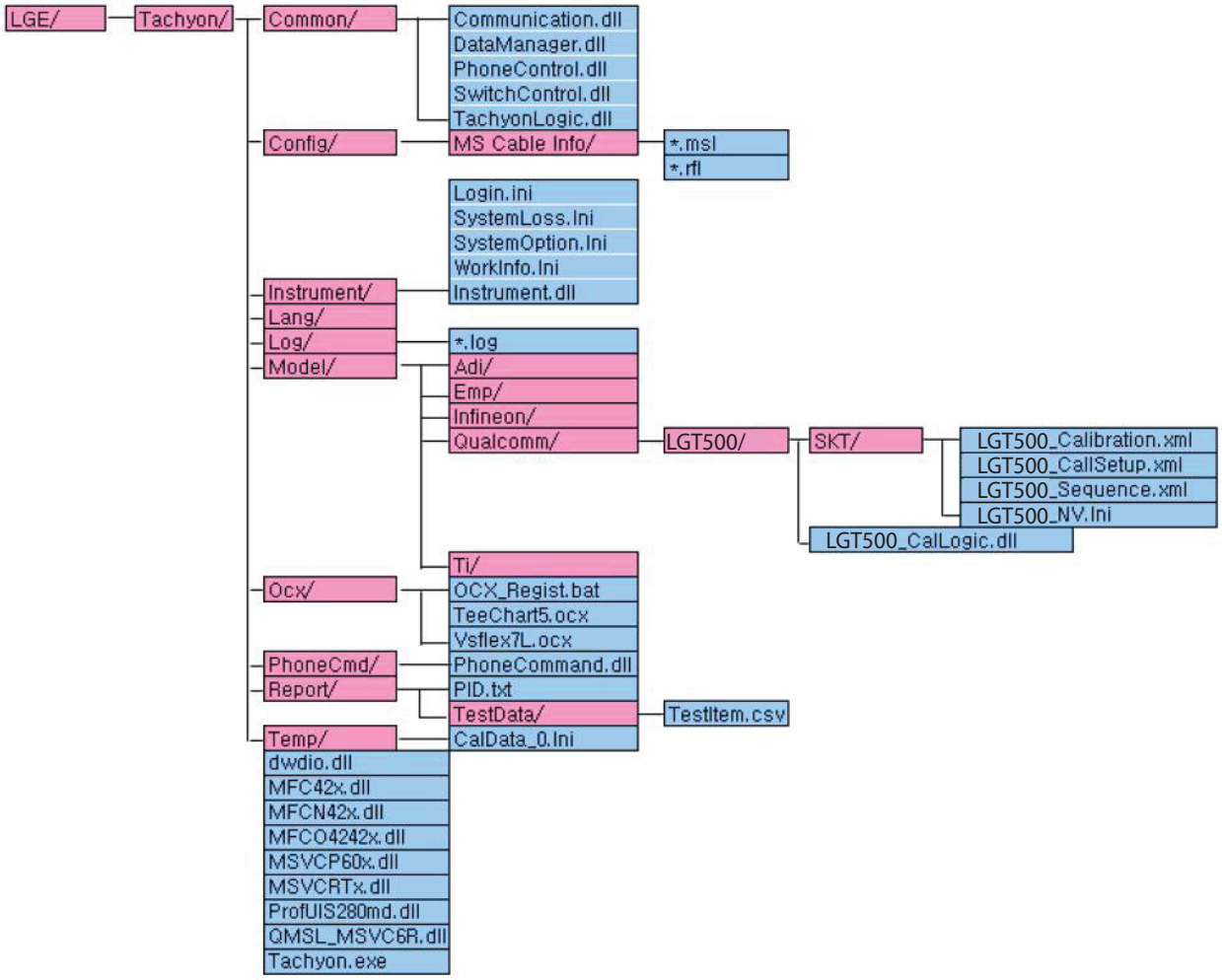


12.AUTO CALIBRATION

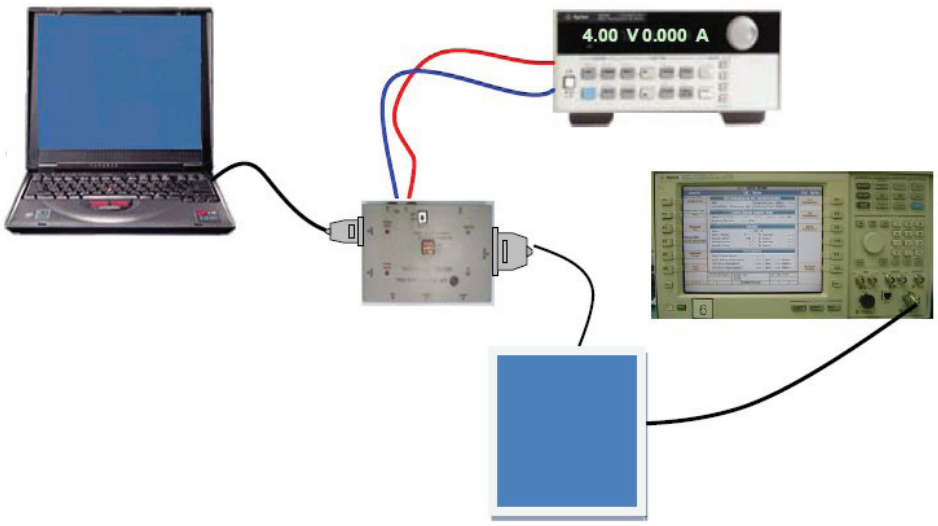
12.1 Overview

Auto-cal (Auto Calibration) is the PC side Calibration tool that perform Tx, Rx and Battery Calibration with Agilent 8960(GSM call setting instrument) and Tektronix PS2521G(Programmable Power supply).
Auto-cal generates calibration data by communicating with phone and measuring equipment then write it into calibration data block of flash memory in GSM phone.

12.2 Tachyon Directory

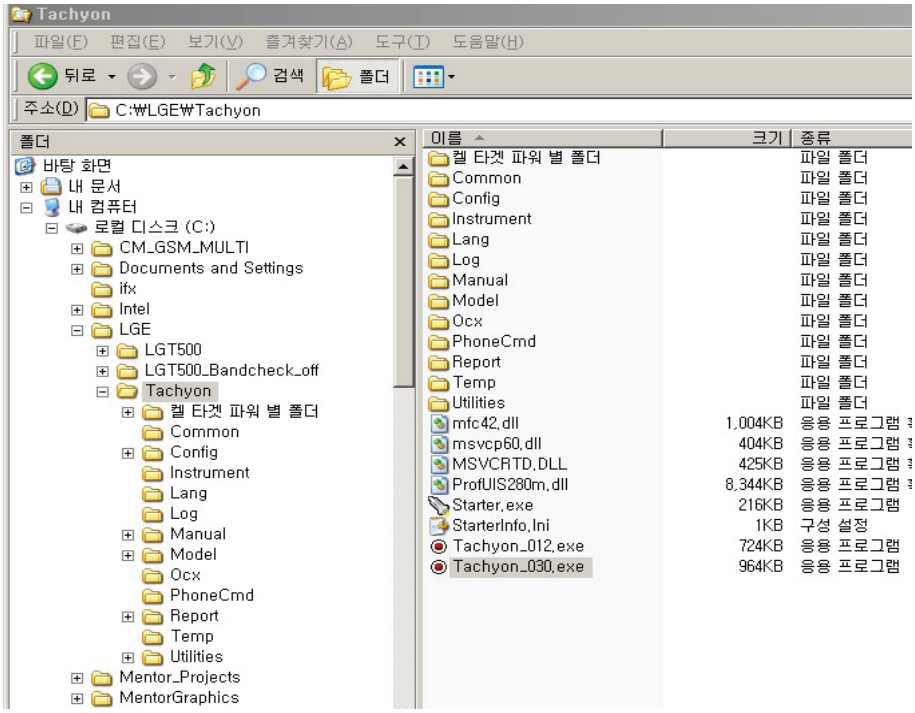


12.3 Test Equipment Setup

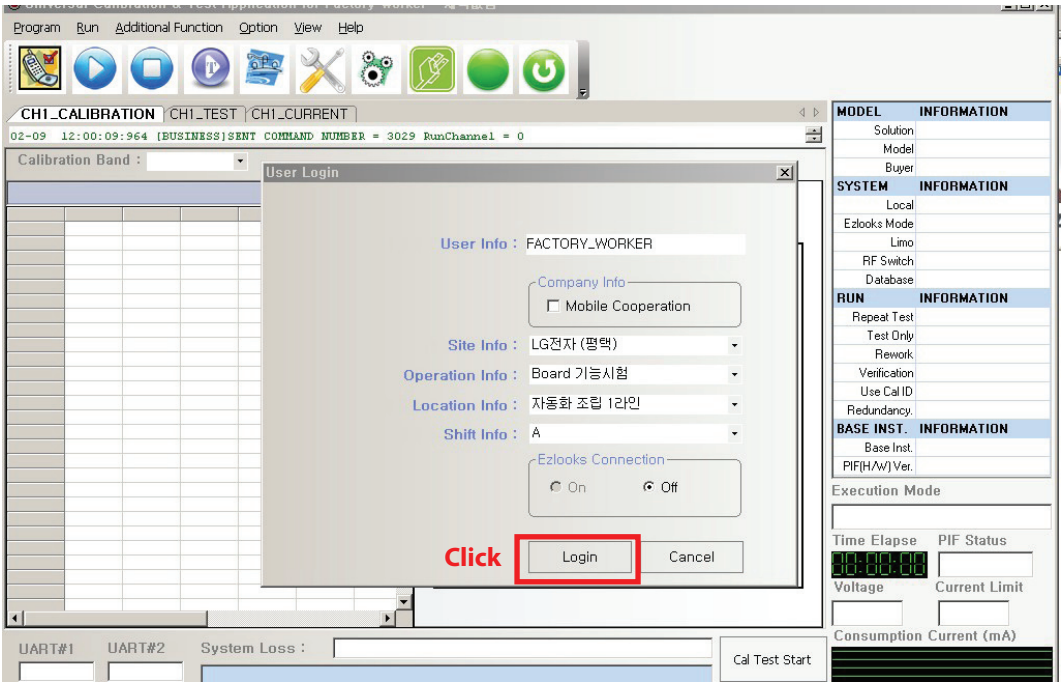


12.4 Procedure

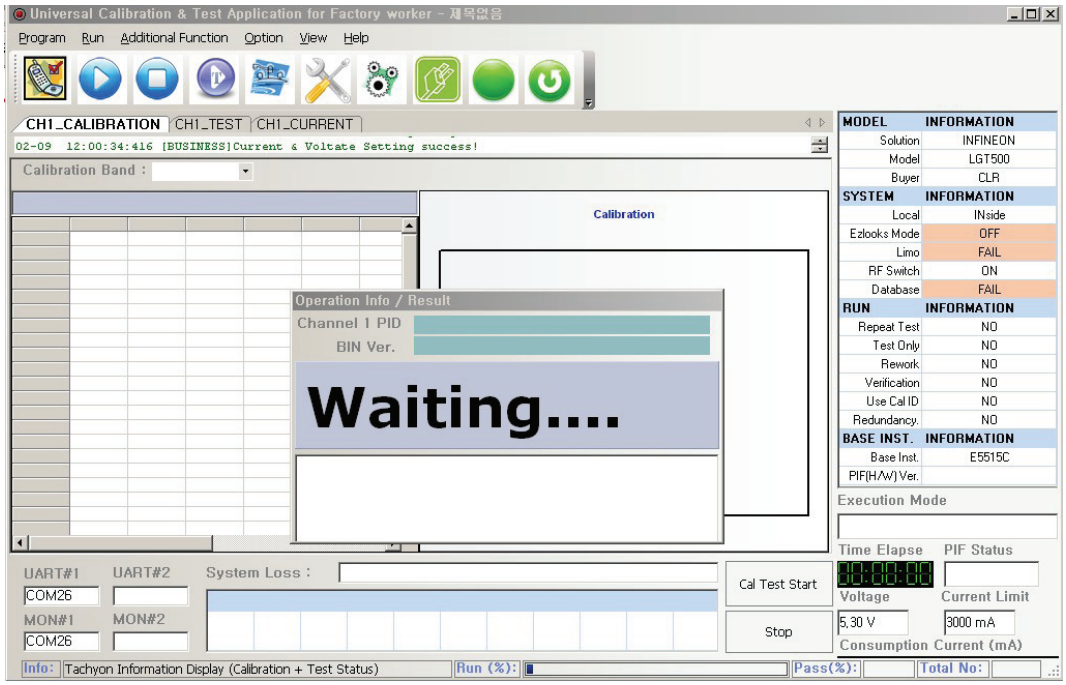
1 .Turn on the Phone.
2. "/LGE/Tachyon/Tachyon.exe"



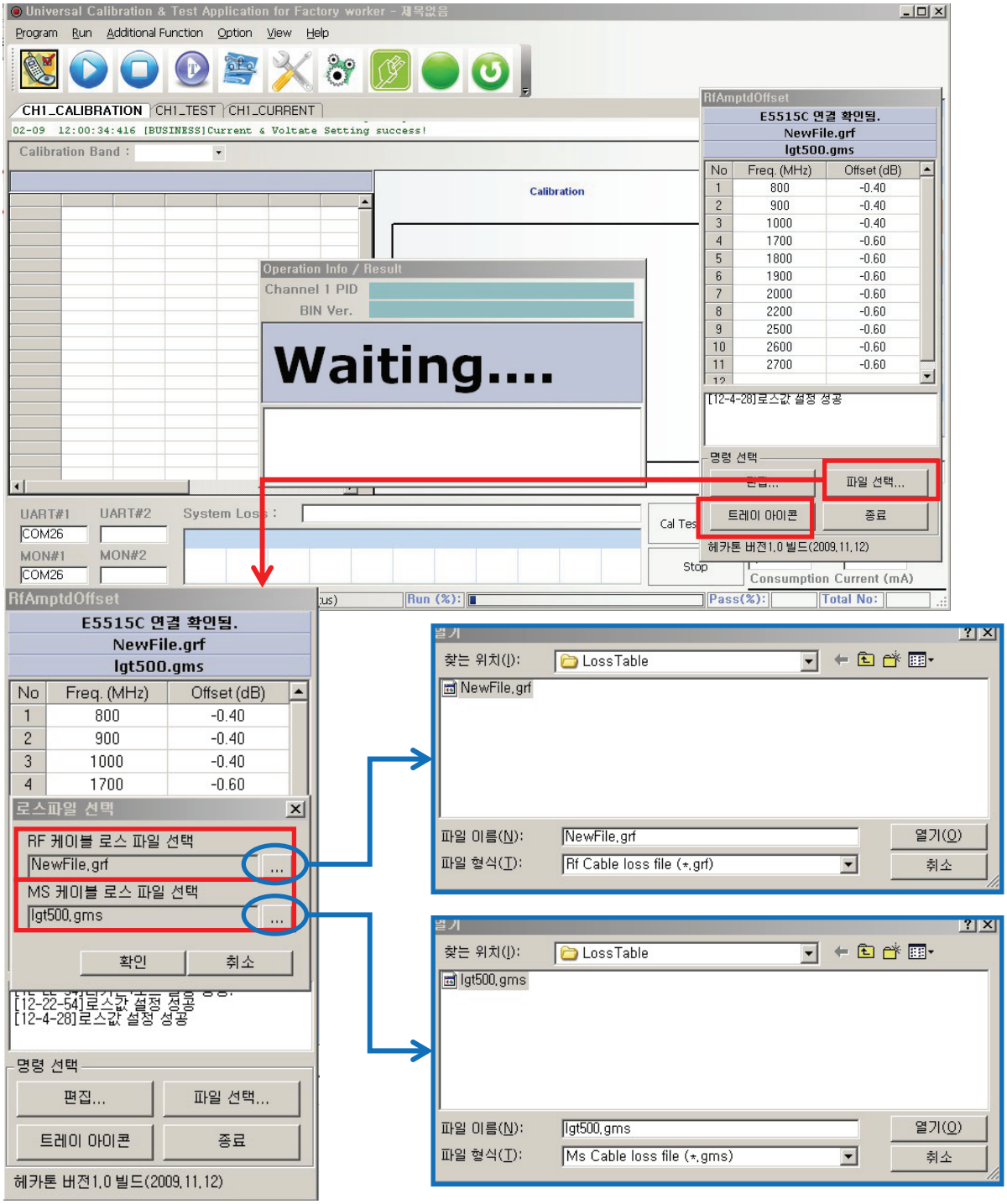
3. Tachyon Login



4. Tachyon Main

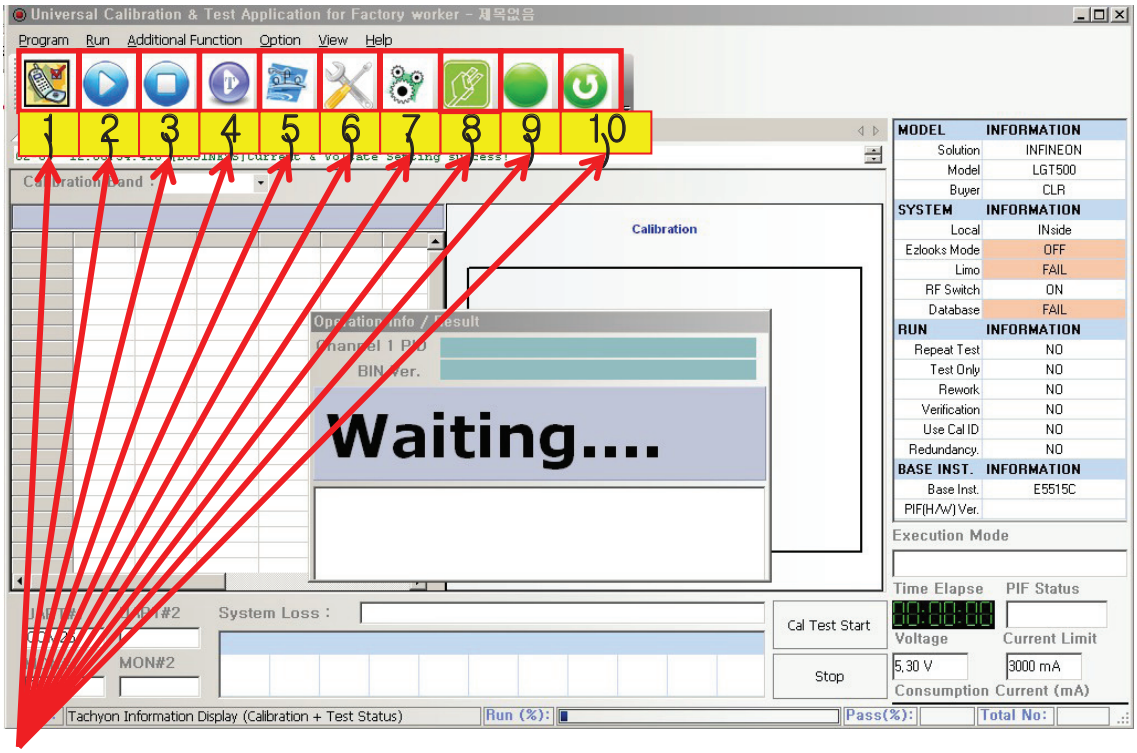


5. Tachyon Loss Setting



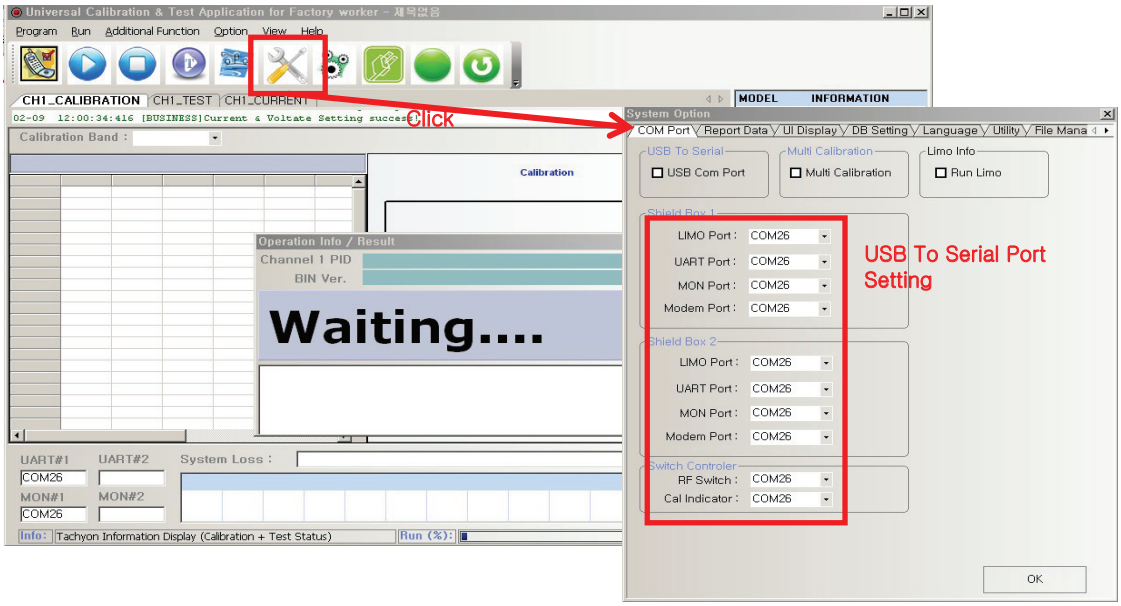
6. Tachyon Setting

(1) Tachyon Main UI

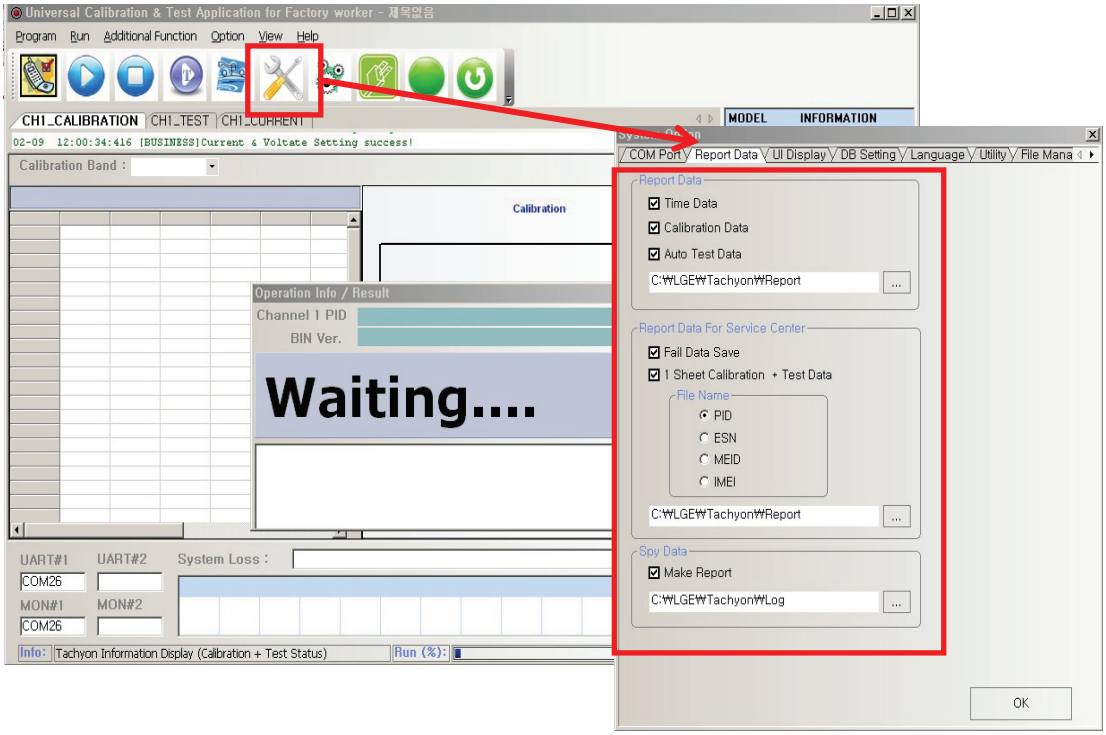


1) User Model Selection
2) Calibration + Auto Test
3) Stop
4) Auto Test Only
5) Loss Setting
6) System Option Setting
7) Running Option Setting
8) Voltage Current Setting
9) Show Result Window
10) Setting 후에 click

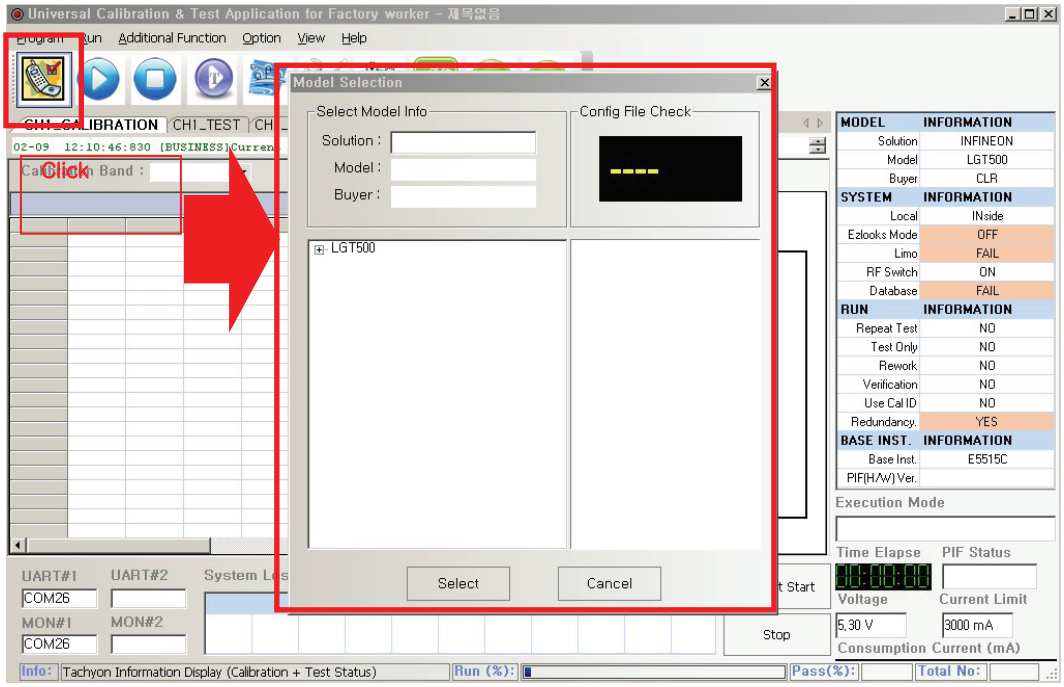
(2) Click “System Option Setting” Menu

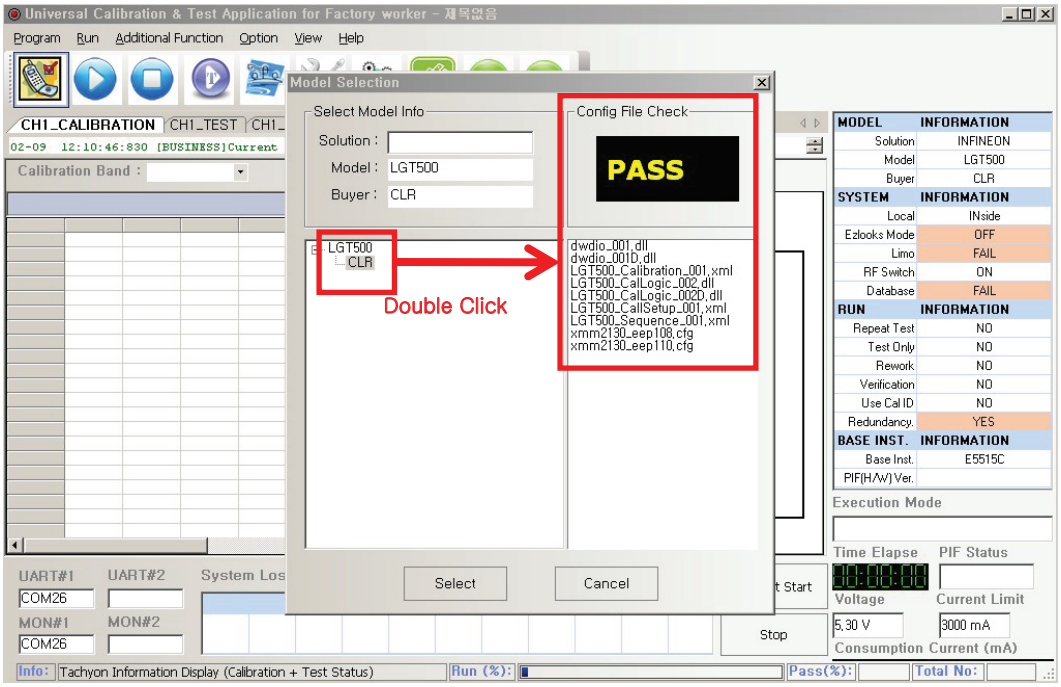


(3) Report Data

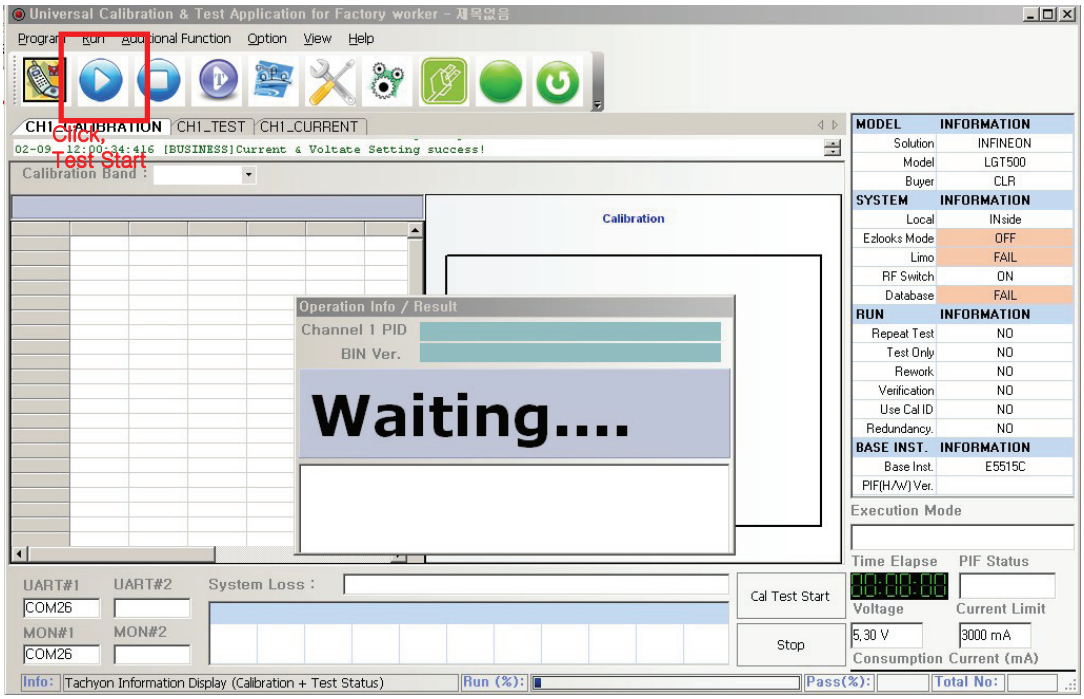


7. Click “User Model Selection” Menu

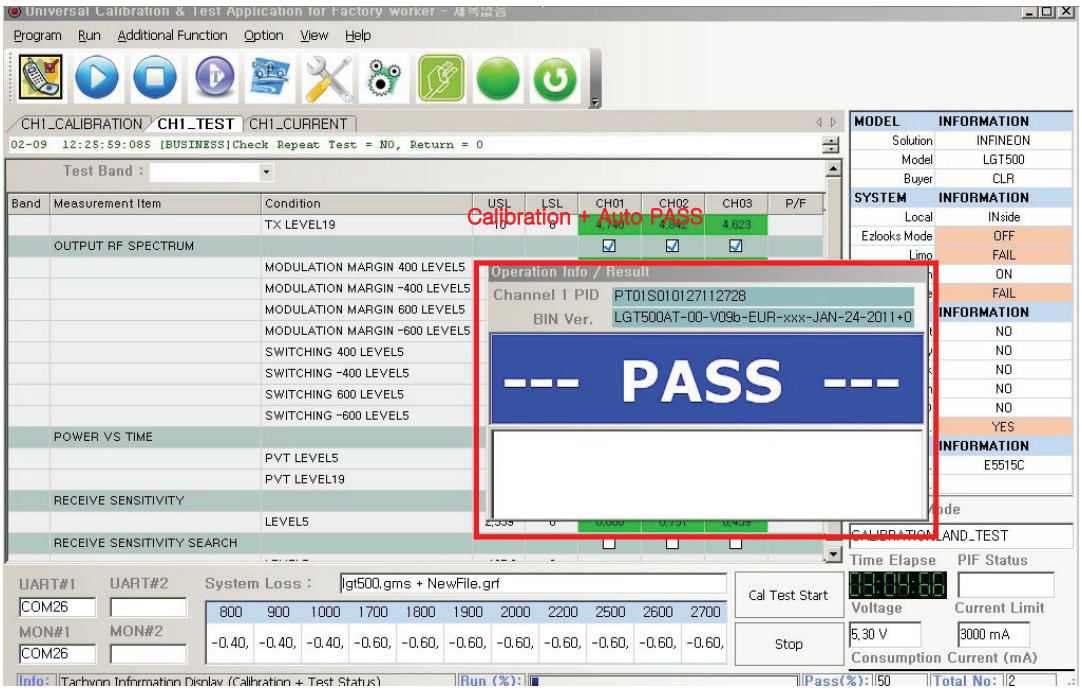




8. Tachyon RF Calibration Start



9. Tachyon RF Calibration finishes.



12.5 AGC

This procedure is for Rx calibration.
In this procedure, We can get RSSI correction value. Set band EGSM and press Start button the result window will show correction values per every power level and gain code and the same measure is performed per every frequency.

12.6 APC

This procedure is for Tx calibration.
In this procedure you can get proper scale factor value and measured power level.

12.7 ADC

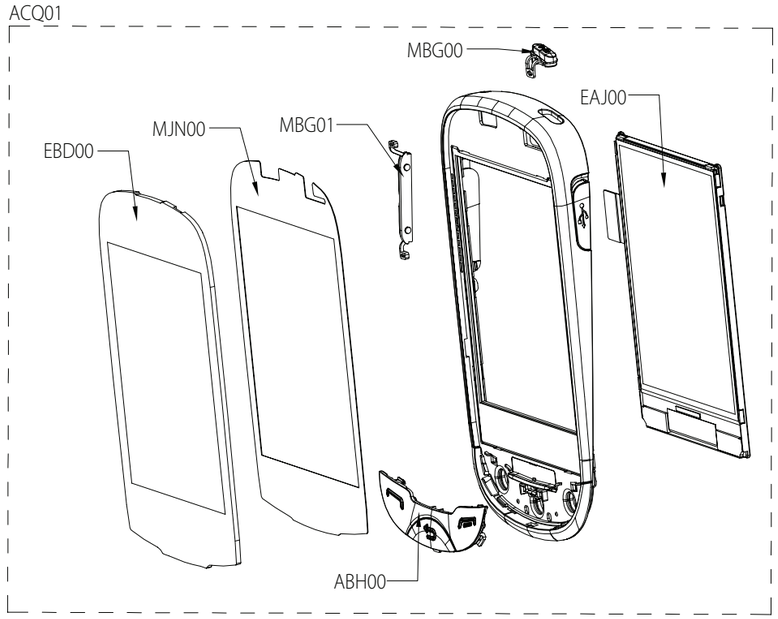
This procedure is for battery calibration.
You can get main Battery Config Table and temperature Config Table will be reset.

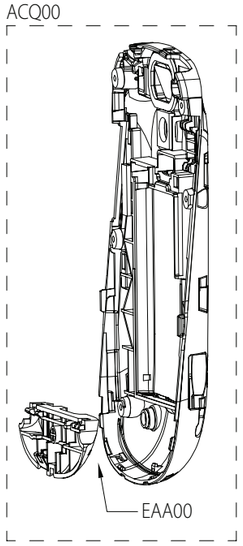
11.8 Target Power

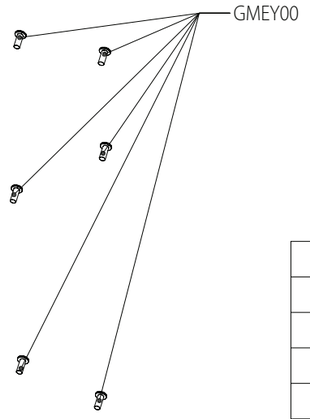
BAND	Description	Low	Middle	High
GSM 850	Channel	128	191	251
	Frequency	824.2 MHz	836.8 MHz	848.8 MHz
	Max power	32.8 dBm	32.8 dBm	32.8 dBm
EGSM 900	Channel	975	37	124
	Frequency	880.2 MHz	897.4 MHz	914.8 MHz
	Max power	32.8 dBm	32.8 dBm	32.8 dBm
DCS1800	Channel	512	699	885
	Frequency	1710.2 MHz	1747.6 MHz	1784.8 MHz
	Max power	29.8 dBm	29.8 dBm	29.8 dBm
PCS 1900	Channel	512	661	810
	Frequency	1850.2 MHz	1880 MHz	1909.8 MHz
	Max power	29.8 dBm	29.8 dBm	29.8 dBm

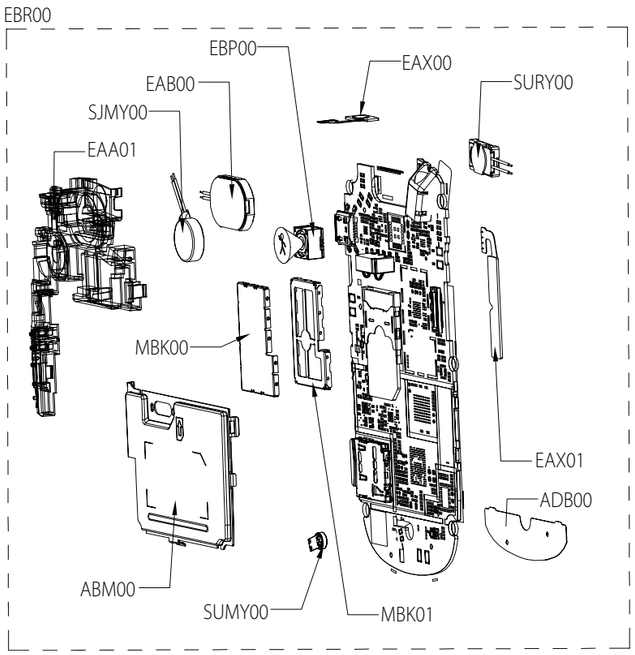
13. EXPLODED VIEW & REPLACEMENT PART LIST

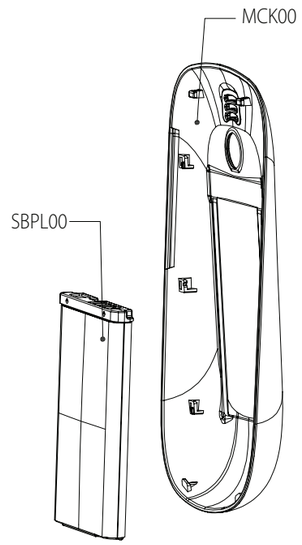
13.1 EXPLODED VIEW











Location	Description
ACQ00	Cover Assembly,Rear
EAA00	PIFA Antenna,Multiple
ACQ01	Cover Assembly,Front
MJN00	Tape,Window
MBG00	Button
MBG01	Button
EBD00	Touch Window Assembly
ABH00	Button Assembly
EAJ00	LCD,Module-TFT
EBR00	PCB Assembly,Main
SJMY00	Motor,DC
EAA01	PIFA Antenna,Bluetooth
SURY00	Receiver
SUMY00	Microphone,Condenser
EAX00	PCB,Sidekey
EAX01	PCB,Sidekey
EAB00	Speaker,Dual Mode
ADB00	Dome Assembly,Metal
MBK00	Can,Shield
ABM00	Can Assembly,Shield
MBK01	Can,Shield
EBP00	Camera Module
GMEY00	Screw,Machine
SBPL00	Mobile Phone Battery Li-Ion
MCK00	Cover,Battery

13.2 Replacement Parts <Mechanic component>

Note: This Chapter is used for reference, Part order is ordered by SBOM standard on GCSC

Level	Location No.	Description	PartNumber	Spec	Remark
1	AGQ000000	Phone Assembly	AGQ86533001	LGT500.ADEUBK BK:Black -	
2	MEZ002100	Label, Approval	MLAA0062303	COMPLEX KB770 DEUBK ZZ:Without Color -	
2	ACQ100400	Cover Assembly, EMS	ACQ85597801	LGT500.ADEUBK BK:Black -	
3	ACQ00	Cover Assembly, Rear	ACQ85441401	LGT500.ADEUBK BK:Black -	
4	EAA00	PIFA Antenna, Multiple	EAA62584801	KI-M08622 QUAD -2DB 5 Metal Stamping Type - KOMATECH CO., LTD	
4	MEZ000900	Label, After Service	MLAB0001102	COMPLEX C2000 CGRSV WA:White C2000 USASV DIA 4.0 PRINTING,	
4	MKC009400	Window, Camera	MKC63919101	CUTTING PMMA LGT500.ADEUBK BK:Black -	
4	MJN009400	Tape, Camera	MJN67754601	CUTTING PET LGT500.ADEUBK ZZ:Without Color -	
4	MHK000000	Sheet	MHK63389001	CUTTING PC SHEET LGT500.ADEUBK BK:Black -	
4	MDJ000000	Filter	MDJ63086201	CUTTING PET LGT500.ADEUBK BK:Black -	
4	MCQ015700	Damper, Connector	MCQ66593101	CUTTING PET LGT500.ADEUBK BK:Black -	
4	MCQ074200	Damper, Speaker	MCQ66593001	CUTTING PET LGT500.ADEUBK BK:Black -	
4	MCQ009400	Damper, Camera	MCQ66592901	CUTTING PET LGT500.ADEUBK BK:Black -	
4	MCQ049800	Damper, Motor	MCQ66592801	CUTTING PET LGT500.ADEUBK BK:Black -	
4	MCK063300	Cover, Rear	MCK66590401	MOLD PC LUPOY SC-1004A LGT500.ADEUBK BK:Black -	
3	ACQ003400	Cover Assembly, Bar	ACQ85442301	LGT500.ADEUBK BK:Black -	
4	MJN061100	Tape, Protect	MJN67776201	CUTTING PET LGT500.ADEUBK BL:Blue -	
4	ACQ01	Cover Assembly, Front	ACQ85466201	LGT500.ADEUBK BK:Black -	
5	MCR000000	Decor	MCR64367801	MOLD PC LUPOY SC-1004A LGT500.ADEUBK BK:Black -	

Level	Location No.	Description	PartNumber	Spec	Remark
5	MJN00	Tape, Window	MJN67754101	CUTTING PET LGT500.ADEUBK ZZ:Without Color -	
5	MCQ000000	Damper	MCQ66592601	CUTTING PET LGT500.ADEUBK BK:Black -	
5	MCQ043300	Damper, LCD	MCQ66592501	CUTTING PET LGT500.ADEUBK BK:Black -	
5	MCK032700	Cover, Front	MCK66589701	MOLD PC LUPOY SC-1004A LGT500.ADEUBK BK:Black -	
5	MBL063800	Cap, Receptacle	MBL64823301	MOLD PC+ABS LGT500.ADEUBK BK:Black -	
5	MBG00	Button	MBG64143401	MOLD PC LUPOY SC-1004A LGT500.ADEUBK BK:Black -	
5	MBG01	Button	MBG64110801	MOLD PC LUPOY SC-1004A LGT500.ADEUBK BK:Black -	
5	MAZ000000	Bracket	MAZ63045201	PRESS SUS 304 0.4 LGT500.ADEUBK ZZ:Without Color -	
5	MET099500	INSERT, NUT	MICE0016905	MECH_COMMON ZY, ZZ, PRESS, STS, , , , ,	
5	MCR000001	Decor	MCR64368001	MOLD ABS LGT500.ADEUBK SV:Silver -	
5	MJN020801	Tape, Decor	MJN67754501	CUTTING PET LGT500.ADEUBK ZZ:Without Color -	
5	MJN000000	Tape	MJN67754401	CUTTING PET LGT500.ADEUBK ZZ:Without Color -	
5	MJN020800	Tape, Decor	MJN67754201	CUTTING PET LGT500.ADEUBK ZZ:Without Color -	
5	MCQ000001	Damper	MCQ66592701	CUTTING PET LGT500.ADEUBK BK:Black -	
4	MEV000000	Insulator	MEV63892101	CUTTING TAPE LGT500.ADEUBK GN:Green -	
4	MEZ000000	Label	MLAZ0038303	COMPLEX LG-LC3200 WA:White PRINTING, PPRI PRINTING	
4	EBD00	Touch Window Assembly	EBD60946801	RESISTIVE TOUCH F-F-P None 2.8inch Contact Type -	
4	ABH00	Button Assembly	ABH74180201	LGT500.ADEUBK BK:Black -	
4	EAJ00	LCD, Module-TFT	EAJ61771701	LM283DN2A QVGA 2.8INCH 240X320 400CD COLOR 70% 4/3 500:1 60Hz Inverter N - TOVIS	
3	EBR00	PCB Assembly, Main	EBR73656301	LGT500.ADEUBK 1.0 Main	
4	EBR071500	PCB Assembly, Main, Insert	EBR73265801	LGT500.ADEUBK 1.1 Main	
5	RAA050100	Resin, PC	BRAH0001301	UF-1060	
5	SJMY00	Motor, DC	SJMY0007108	WHVM-1030B10 WHVM-1030B10, 3 V, 80 mA, 10*3.0, 12mm SEOUNGHYUN SMT	

Level	Location No.	Description	PartNumber	Spec	Remark
5	EAA01	PIFA Antenna, Bluetooth	EAA62466803	KI-M24682 SINGLE -2DB 5 Metal Stamping Type - KOMATECH CO., LTD	
5	SURY00	Receiver	SURY0010120	KR120703W1P ASSY, dB, ohm, 1207*2.5T, 10mm, WIRE, KIRYN TELECOM CO., LTD	
5	SUMY00	Microphone, Condenser	SUMY0003816	OBM-410L44-RC1882 -44DB 2.2KOHM OMNI 1TO10V 4x1.0t FPCB BSE CO., LTD.	
5	EAX00	PCB, Sidekey	EAX64030501	LGT500.ADEUBK 1.0 POLYI Double 2 0.4 Sidekey	
5	EAX01	PCB, Sidekey	EAX64030301	LGT500.ADEUBK 1.0 POLYI Double 2 0.4 SIDEKEY	
5	EAB00	Speaker, Dual Mode	EAB62308201	Nd-Fe-B 700mW 8OHM 91DB 720HZ 1812*3.0T wire 15mm DCCA coil WIRE	
5	ADB00	Dome Assembly, Metal	ADB73618901	LGT500.ADEUBK WA:White -	
5	MBK00	Can, Shield	MBK62856101	COMPLEX LGT500.ADEUBK ZZ:Without Color -	
5	MEV000000	Insulator	MEV63892901	COMPLEX LGT500.ADEUBK ZZ:Without Color -	
5	ABM00	Can Assembly, Shield	ABM73576301	LGT500.ADEUBK ZZ:Without Color -	
6	MBK070300	Can, Shield	MBK62913401	PRESS SUS304 0.2 LGT500.ADEUBK ZZ:Without Color -	
6	MKU101700	Absorber, Electromagnetic Wave	MKU30323201	COMPLEX LGT500.ADEUBK BK:Black -	
4	EBR071800	PCB Assembly, Main, SMT	EBR73656401	LGT500.ADEUBK 1.0 Main	
5	EBR071700	PCB Assembly, Main, SMT Top	EBR73549701	LGT500.ADEUBK 1.1 Main	
6	EAX010000	PCB, Main	EAX64005201	LGT500.ADEUBK 1.0 FR-4 SBL 8 0.8 Main	
5	EBR071600	PCB Assembly, Main, SMT Bottom	EBR73548901	LGT500.ADEUBK 1.1 Main	
6	MBK01	Can, Shield	MBK62913301	PRESS SUS304 0.2 LGT500.ADEUBK ZZ:Without Color -	
6	EBP00	Camera Module	EBP61321801	LM22HYFFR LM22HYFFR 2M hynix 1/5 HANSUNG ELCOMTEC CO., LTD.	
6	BAT201	Module, Assembly	SMZY0026701	EECEP0F333YD GM750 SFRTN Backup Capacitor, 0.03F, 3.8pi, Module Assembly PANASONIC INDUSTRIAL KOREA CO., LTD	
5	MEZ000000	Label	MLAZ0038301	COMPLEX LG-VX6000 ZZ:Without Color PID Label 4 Array PRINTING,	

Level	Location No.	Description	PartNumber	Spec	Remark
3	GMEY00	Screw, Machine	GMEY0009201	GMEY0009201 BH + 2.7mM 3.5mM MSWR3 FZB N N LG ELECTRONICS INC.	
1	AGF000000	Package Assembly	AGF76203001	LGT500.ADEUBK ZZ:Without Color LG-T500 STD(EU1W/STD_UB/1200EA)	
2	MAY084000	Box, Unit	MAY65139101	BOX Paper 120 56 90 5 COLOR LGT500.AHUNBK ZZ:Without Color LG-T500 STD (EU1W/English)	
2	APLY00	PALLET ASSY	APLY0003901	GD510 BALBK BK, ZZ, EU1 TYPE_Body(SW)+Cap(EU)+AL_1200EA	
3	MBEC00	Box, Carton	MBEC0003601	COMPLEX GD510 CZESV ZZ:Without Color -	
3	MCCL00	Cap, Box	MCCL0002501	COMPLEX GD510 CZESV ZZ:Without Color -	
3	MPCY00	Pallet	MPCY0012403	COMPLEX KG800 FRABK DB:DARK BLUE -	
2	MBAD00	Bag, Vinyl	MBAD0005204	COMPLEX LG-LX260 SPRAG ZZ:Without Color -	
2	MBEE00	Box, Master	MBEE0061001	COMPLEX GD510 CZESV ZZ:Without Color -	
2	MLAC00	Label, Barcode	MLAC0004541	COMPLEX HB620 KPNBK ZZ:Without Color -	
2	MLAJ00	Label, Master Box	MLAJ0004402	COMPLEX CG300 CGR ZZ:Without Color LABEL, MASTER BOX(for CGR TDR 2VER. mbox_label)	
2	MLAZ01	Label	MLAZ0050901	COMPLEX KU990 GBRBK ZZ:Without Color -	
1	AAD000000	Addition Assembly	AAD85815401	LGT500.ADEUBK BK:Black -	
2	MCK00	Cover, Battery	MCK66592901	MOLD PC LUPOY SC-1004A LGT500.ADEUBK BK:Black -	

13.2 Replacement Parts <Main component>

Note: This Chapter is used for reference, Part order is ordered by SBOM standard on GCSC

Level	Location No.	Description	PartNumber	Spec	Remark
6	ZD504, ZD506	Varistor	SEVY0003601	ICVL0505101V150FR 5.6V 0% 60F 1.0*0.5*0.55 NONE SMD R/TP INNOCHIPS TECHNOLOGY	
6	VA608, VA609	Varistor	SEVY0005201	EVLC5S02050 5.5V 0% 50F 1.0*0.5*0.6 - SMD R/TP AMOTECH CO., LTD.	
6	D401, ZD401	Diode, TVS	EDTY0009401	VMNZ6.8CST2R 5.5V 0 10V 0A 200mW SC70 R/TP 6P 5 ROHM.	
6	R415, R418, R419, R420	Resistor, Chip	ERHZ0000505	MCR01MZP5J681 680OHM 5% 1/16W 1005 R/TP - ROHM.	
6	L501	Inductor, Multilayer, Chip	ELCH0003842	LQG15HSR10J02D 100NH 5% - 150mA 1.25OHM 600MHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP MURATA MANUFACTURING CO., LTD.	
6	FB401	Filter, Bead	SFBH0008102	BLM15HD182SN1D 1800 ohm 1.0X0.5X0.5 25% 2.2 ohm 0.2A SMD R/TP 2P 0 MURATA MANUFACTURING CO., LTD.	
6	ZD501, ZD502, ZD505	Diode, TVS	EDTY0012501	UCLAMP3311T.TCT SLP1006P2T, 3.3 V, 40 W, R/TP, 4.3 V, 6.5 V, 5 A, R/TP, 2P, 1 SEMTECH CORPORATION	
6	C234, C235, C238, C239, C240, C241, C413, C524, C526	Capacitor, Ceramic, Chip	ECCH0000122	MCH155A470JK 47pF 5% 50V NP0 -55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	
6	CN404	Connector, Terminal Block	ENZY0020701	KQ13L-4R 4P 2.7 ANGLE SMD R/TP - HIROSE KOREA CO., LTD	
6	C104	Capacitor, Ceramic, Chip	ECCH0000104	MCH155A030C 3pF 0.25PF 50V NP0 -55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	
6	C107	Inductor, Multilayer, Chip	ELCH0003838	LQG15HS8N2J02D 8.2NH 5% - 300mA 0.24OHM 3.7GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP MURATA MANUFACTURING CO., LTD.	
6	C708	Capacitor, Ceramic, Chip	ECZH0000822	C1005C0G1H1R5CT000F 1.5pF 0.25PF 50V NP0 - 55TO+125C 1005 R/TP - TDK KOREA COOPERATION	

Level	Location No.	Description	PartNumber	Spec	Remark
6	FB505, FB506	Filter, Bead	SFBH0007101	BLM15AG121SN1D 120 ohm 1.0X0.5X0.5 25% 0.25 ohm 0.5A SMD R/TP 2P 0 MURATA MANUFACTURING CO., LTD.	
6	L504, L505	Inductor, Multilayer, Chip	ELCH0005009	HK1005 R10J 100NH 5% - 150mA 1.5OHM 600MHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP TAIYO YUDEN CO., LTD	
6	C302, C306	Capacitor, Ceramic, Chip	ECCH0006201	C1608X5R0J475KT000N 4.7uF 10% 6.3V X5R - 55TO+85C 1608 R/TP - TDK CORPORATION	
6	C106	Inductor, Multilayer, Chip	ELCH0003815	LQG15HS2N7S02D 2.7NH 0.3NH - 300mA 0.15OHM 6GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP MURATA MANUFACTURING CO., LTD.	
6	C116, C117	Capacitor, Ceramic, Chip	ECZH0000806	C1005C0G1H050CT000F 5pF 0.25PF 50V NP0 - 55TO+125C 1005 R/TP - TDK KOREA COOPERATION	
6	C503, C621, C622, C623	Capacitor, Ceramic, Chip	ECCH0002001	C1005JB0J104KT000F 0.1uF 10% 6.3V Y5P - 30TO+85C 1005 R/TP - TDK CORPORATION	
6	L115, L116	Inductor, Multilayer, Chip	ELCH0001003	ELJRF6N8JFB ELJRF6N8JFB, 6.8 nH, J, 1005, R/TP, chip inductor PBFREE Panasonic Corporation	
6	U402	IC, Resistive Touch Screen Controller	EUSY0430501	SX8650 WLCSP , 12 , R/TP , Touch Screen Controller , ; , IC, A/D Converter SEMTECH CORPORATION	
6	X201	Crystal	EXXY0025701	TSX- 3225 TSX- 3225, 26 MHz, 10 PPM, 8 pF, 40 ohm, SMD, 32X25X0.6, X-Tal (Infinion chip), Pb-Free EPSON TOYOCOM CORP	
6	C411, C703, C704, C714	Capacitor, Ceramic, Chip	ECCH0000110	MCH155A100D 10pF 0.25PF 50V NP0 -55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	
6	C111, C511, C512, C518, C528, C530, C531, C533	Capacitor, Ceramic, Chip	ECCH0000120	MCH155A390J 39pF 5% 50V NP0 -55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	
6	C227	Capacitor, Ceramic, Chip	ECCH0000137	C1005X7R1H331KT000F 0.33nF 10% 50V X7R - 55TO+125C 1005 R/TP - TDK KOREA COOPERATION	

Level	Location No.	Description	PartNumber	Spec	Remark
6	C108, C109, C110, C236, C237, C509, C510, C536, C712, C713	Capacitor, Ceramic, Chip	ECCH0000143	MCH155CN102KK 1nF 10% 50V X7R -55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	
6	U601	IC, Sub PMIC	EUSY0344403	RT9396GQW QFN, 24, R/TP, 4CH+2LDO, IC, Sub PMICIC, Sub PMIC RICHTEK TECHNOLOGY CORP.	
6	C120, C309, C312, C408	Capacitor, Ceramic, Chip	ECCH0000115	MCH155A220JK 22pF 5% 50V NP0 -55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	
6	R1112, R802, R804, R814	PCB ASSY, MAIN, PAD SHORT	SAFP0000401	LG-LU3000 LGTBK, MAIN, A,	
6	L501	Inductor, Multilayer, Chip	ELCH0003842	LQG15HSR10J02D 100NH 5% - 150mA 1.25OHM 600MHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP MURATA MANUFACTURING CO., LTD.	
6	R203	Resistor, Chip	ERHZ0000484	MCR01MZP5J471 470OHM 5% 1/16W 1005 R/TP - ROHM.	
6	C213, C214	Capacitor, Ceramic, Chip	ECCH0002002	C1005X7R1A473KT000F 47000pF 10% 10V Y5P - 30TO+85C 1005 R/TP - TDK CORPORATION	
6	C201, C204, C207, C217, C218, C231, C303, C305, C307, C308, C310, C313, C314, C315, C401, C409, C414, C417, C527, C529	Capacitor, Ceramic, Chip	ECZH0003103	GRM36X7R104K10PT 100nF 10% 10V X7R - 55TO+125C 1005 R/TP - MURATA MANUFACTURING CO., LTD.	

Level	Location No.	Description	PartNumber	Spec	Remark
6	C209, C215, C216, C219, C400, C402, C403, C416, C507, C508, C539, C540, C603, C607, C608, C609	Capacitor, Ceramic, Chip	ECCH0004904	GRM155R60J105K 1uF 10% 6.3V X5R -55TO+85C 1005 R/TP - MURATA MANUFACTURING CO., LTD.	
6	C208, C211, C242	Capacitor, Ceramic, Chip	ECZH0001216	C1005X5R1A224KT000E 220nF 10% 10V X5R -55TO+85C 1005 R/TP - TDK KOREA COOPERATION	
6	FB507, R106, R320, R427, R428, R701, R707, R709	Resistor, Chip	ERHZ0000401	MCR01MZSJ000 0OHM 5% 1/16W 1005 R/TP - ROHM.	
6	C105, C121, C122, C123, C525	Capacitor, Ceramic, Chip	ECZH0000813	C1005C0G1H101JT 100pF 5% 50V NP0 -55TO+125C 1005 R/TP - TDK KOREA COOPERATION	
6	FL601, FL602, FL603	Filter, EMI/Power	SFEY0010501	ICVE10184E150R101FR ESD/EMI 0HZ 15pF 0H SMD R/TP INNOCHIPS TECHNOLOGY	
6	R425, R426, R503	Resistor, Chip	ERHZ0000402	MCR01MZP5J100 10OHM 5% 1/16W 1005 R/TP - ROHM.	
6	C517, C519	Capacitor, Ceramic, Chip	ECCH0000179	GRM155R71C223K 22nF 10% 16V X7R -55TO+85C 1005 R/TP - MURATA MANUFACTURING CO., LTD.	
6	FB201	Filter, Bead	SFBH0007103	BLM15BB750SN1D 75 ohm 1.0X0.5X0.5 25% 0.4 ohm 0.3A SMD R/TP 2P 0 MURATA MANUFACTURING CO., LTD.	
6	C210, C243, C244, C537	Capacitor, Ceramic, Chip	ECCH0000113	MCH155A180J 18pF 5% 50V NP0 -55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	

Level	Location No.	Description	PartNumber	Spec	Remark
6	C101, C702, C706, C707	Capacitor, Ceramic, Chip	ECCH0000155	MCH153CN103KK 10nF 10% 16V X7R -55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	
6	R1101, R504, R510, R520, R604, R605, R702, R703, R711	Wire Pad, Short	SAFP0000501	LG-VS760 VRZ	
6	C205, C206, C229, C230	Capacitor, Ceramic, Chip	ECZH0001217	GRM155R60J474K 470nF 10% 6.3V X5R -25TO+70C 1005 BK-DUP - MURATA MANUFACTURING CO., LTD.	
6	R210	Resistor, Chip	ERHZ0002401	RC1005J123CS 12KOHM 5% 1/16W 1005 R/TP - SAMSUNG ELECTRO-MECHANICS CO., LTD.	
6	FL604, FL605	Filter, EMI/Power	SFEY0011601	ICVE10184E150R500FR ESD/EMI 0HZ 15pF 0H SMD R/TP INNOCHIPS TECHNOLOGY	
6	C412, C501	Capacitor, Ceramic, Chip	ECCH0000117	CL05C270JB5NNNC 27pF 5% 50V NP0 -55TO+125C 1005 R/TP 0.5 SAMSUNG ELECTRO-MECHANICS CO., LTD.	
6	C102, C317, C318, C319, C320, C321, C415	Capacitor, Ceramic, Chip	ECZH0000830	C1005C0G1H330JT000F 33pF 5% 50V NP0 -55TO+125C 1005 R/TP - TDK KOREA COOPERATION	
6	M501	IC, Audio Sub System	EUSY0420001	TPA2055D3 1.6~5.5V 0W WLCSP R/TP 20P - TEXAS INSTRUMENTS INCO.	
6	L502, L503, R414, R609, R610	Resistor, Chip	ERHZ0000206	MCR01MZP5F10R0 10OHM 1% 1/16W 1005 R/TP - ROHM.	
6	R224, R306, R402, R403	Resistor, Chip	ERHZ0000405	MCR01MZP5J103 10KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	VA506, VA507, VA601	Varistor	SEVY0003801	EVLC18S02015 18V 0% 15F 1.0*0.5*0.6 NONE SMD R/TP AMOTECH CO., LTD.	
6	R318	Resistor, Chip	ERHZ0000485	MCR01MZP5J472 4.7KOHM 5% 1/16W 1005 R/TP - ROHM.	

Level	Location No.	Description	PartNumber	Spec	Remark
6	C504, C513, C514, C515, C516	Capacitor, Ceramic, Chip	ECCH0000198	CL05A225MQ5NSNC 2.2uF 20% 6.3V X5R -55TO+85C 1005 R/TP . SAMSUNG ELECTRO-MECHANICS CO., LTD.	
6	R301, R302, R303, R304, R305	Resistor, Chip	ERHY0000275	MCR01MZP5J563 56KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	Q202	TR, Bipolar	EQBN0019201	KTC3770V VSM, 0.1 W, R/TP, 1.2*1.2*0.5 Vcbo=20, Vceo=12, Vebo=2V, Ic=100mA KEC CORPORAITION	
6	R513	Resistor, Chip	ERHZ0000483	MCR01MZP5J470 47OHM 5% 1/16W 1005 R/TP - ROHM.	
6	C212, C225, C505, C506, C521, C522	Capacitor, Ceramic, Chip	ECCH0000151	CL05B472KB5NNNC 4.7nF 10% 25V X7R -55TO+125C 1005 R/TP - SAMSUNG ELECTRO-MECHANICS CO., LTD.	
6	R207, R422, R521	Resistor, Chip	ERHZ0000204	MCR01MZP5F1003 100KOHM 1% 1/16W 1005 R/TP - ROHM.	
6	R221	Resistor, Chip	ERHZ0000449	MCR01MZP5J243 24KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	R501, R511	Resistor, Chip	ERHZ0000407	MCR01MZP5J105 1MOHM 5% 1/16W 1005 R/TP - ROHM.	
6	R212, R227, R228, R311, R417, R502, R602, R606, R612	Resistor, Chip	ERHZ0000406	MCR01MZP5J104 100KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	FB401	Filter, Bead	SFBH0008102	BLM15HD182SN1D 1800 ohm 1.0X0.5X0.5 25% 2.2 ohm 0.2A SMD R/TP 2P 0 MURATA MANUFACTURING CO., LTD.	
6	C234, C235, C238, C239, C240, C241, C413, C524, C526	Capacitor, Ceramic, Chip	ECCH0000122	MCH155A470JK 47pF 5% 50V NP0 -55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	

Level	Location No.	Description	PartNumber	Spec	Remark
6	R413	Resistor, Chip	ERHZ0000506	MCR01MZP5J682 6.8KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	L401, L402	Inductor, Multilayer, Chip	ELCH0012503	LQW15AN56NJ00D 56NH 5% - 200mA 1.17OHM 2.8GHZ 25 NON SHIELD NONE 1.0X0.5X0.5MM R/TP MURATA MANUFACTURING CO., LTD.	
6	R517, R518	Resistor, Chip	ERHY0003301	MCR01MZP5J101 100OHM 5% 1/16W 1005 R/TP - ROHM.	
6	R706	Resistor, Chip	ERHY0000128	MCR01MZP5F1502 15KOHM 1% 1/16W 1005 R/TP - ROHM.	
6	C223, C502	Capacitor, Ceramic, Chip	ECCH0007803	CL10A106MP8NNNC 10uF 20% 10V X5R -55TO+85C 1608 R/TP 0.8MM SAMSUNG ELECTRO-MECHANICS CO., LTD.	
6	C604, C605, C610, C701, C705	Capacitor, Ceramic, Chip	ECCH0007804	CL05A225MP5NSNC 2.2uF 20% 10V X5R -55TO+85C 1005 R/TP 0.5MM SAMSUNG ELECTRO-MECHANICS CO., LTD.	
6	C228, C301, C601, C602, C611, C612	Capacitor, Ceramic, Chip	ECZH0001215	C1005X5R1A105KT000F 1uF 10% 10V X5R - 55TO+85C 1005 R/TP - TDK KOREA COOPERATION	
6	VA401, VA402	Varistor	SEVY0001001	EVLC14S02050 14V 0% 50F 1.0*0.5*0.6 NONE SMD R/TP AMOTECH CO., LTD.	
6	C115	Capacitor, Ceramic, Chip	ECZH0000802	C1005C0G1H010CT 1pF 0.25PF 50V NP0 -55TO+125C 1005 R/TP - TDK KOREA COOPERATION	
6	L103, L114	Inductor, Multilayer, Chip	ELCH0003832	LQG15HS2N2S02D 2.2NH 0.3NH - 300mA - - 0.12OHM 6GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP MURATA MANUFACTURING CO., LTD.	
6	S301	Socket, Card	ENSY0023601	SCHA4B0402 Micro-SD 8P ANGLE SMD R/TP - ALPS ELECTRIC KOREA CO., LTD.	
6	J301	Card Socket	ENSY0025901	GCA26A-8S-H16-M-E1000 SIM 8P ANGLE SMD R/TP - LS Mtron Ltd.	
6	R229, R230, R512, R515	Resistor, Chip	ERHY0000241	MCR01MZP5J102 1KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	C617, C619	Capacitor, Ceramic, Chip	ECCH0010501	GRM1555C1H7R5D 7.5pF C0G TYPE(No X7R) MURATA MANUFACTURING CO., LTD.	
6	U501	IC, Comparator	EUSY0250501	NCS2200SQ2T2G NCS2200SQ2T2G, SC70, 5 PIN, R/TP, Comparator, pin compatible to EUSY0077701 - - SC70 R/TP 5P - ON SEMICONDUCTOR	

Level	Location No.	Description	PartNumber	Spec	Remark
6	U301	IC, MCP, NAND	EAN61927501	H9DA2GH1GHMMMR-46M NAND/2G SDRAM/1G 1.7VTO1.95V 8.0x9.0x0.9 TR 130P NAND+DDR SDRAM FBGA 2Gb NAND(LB/128Mx16)+1Gb DRAM(DDR/200MHz/16Mx4x16) HYNIX SEMICONDUCTOR INC.	
6	C119	Capacitor, Ceramic, Chip	ECZH0000841	C1005C0G1H560JT000F 56pF 5% 50V NP0 - 55TO+125C 1005 R/TP - TDK KOREA COOPERATION	
6	R514	Resistor, Chip	ERHZ0000445	MCR01MZP5J224 220KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	L203	Inductor, Multilayer, Chip	ELCH0003839	LQG15HS22NJ02D 22NH 5% - 300mA 0.42OHM 1.9GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP MURATA MANUFACTURING CO., LTD.	
6	J501	Jack, Phone	EAG62831701	KJA-PH-3-0176 4P 4P ANGLE R/TP 3.5M BLACK 5P 6.5x12.6x4.0t, Short Detect, All DIP type KSD CO., LTD	
6	R406, R509, R516, R519	Resistor, Chip	ERHZ0000443	MCR01MZP5J222 2.2KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	U1	IC, Analog Switch	EUSY0186504	FSA2259UMX QFN , 8 , R/TP , Dual SPDT , ; , IC, Analog Switch FAIRCHILD SEMICONDUCTOR	
6	L110, L113	Inductor, Multilayer, Chip	ELCH0004710	1005GC2T15NJLF 15NH 5% - 250mA 0.53OHM 2GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP PILKOR ELECTRONICS LTD.	
6	Q501	FET	EQFP0000101	2SJ347 P-CHANNEL MOSFET -20V -7 -0.05A 40OHM 100mW SSM R/TP 3P TOSHIBA	
6	L108, L109	Inductor, Multilayer, Chip	ELCH0004733	1005GC2T4N3SLF 4.3NH 0.3NH - 300mA 0.23OHM 3.5GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP PILKOR ELECTRONICS LTD.	
6	L107	Inductor, Multilayer, Chip	ELCH0001033	HK1005 1N5S-T 1.5NH 0.3NH - 300mA 0.1OHM 6GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP TAIYO YUDEN CO., LTD	
6	L201	Inductor, Wire Wound, chip	ELCP0009410	LQM2HPN3R3MG0 LQM2HPN3R3MG0, 3.3 uH, N, 2x2.5x1.0, R/TP, chip power MURATA MANUFACTURING CO., LTD.	
6	L105, L106	Inductor, Multilayer, Chip	ELCH0003826	LQG15HS3N3S02D 3.3NH 0.3NH - 300mA 0.17OHM 6GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP MURATA MANUFACTURING CO., LTD.	
6	U401	IC, Mini ABB	EAN61833301	LP8727 1.6V to 5.5V 0SEC 0SEC 0W 8 Mini ABB Basic MUIC, Charger IC WL-CSP R/TP 25P NATIONAL SEMICONDUCTOR ASIA PACIFIC PTE. LTD.	
6	R105, R416, R780	Resistor, Chip	ERHZ0000404	MCR01MZP5J102 1KOHM 5% 1/16W 1005 R/TP - ROHM.	

Level	Location No.	Description	PartNumber	Spec	Remark
6	R400	Resistor, Chip	ERHZ0000486	MCR01MZP5J473 47KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	VA608, VA609	Varistor	SEVY0005201	EVLC5S02050 5.5V 0% 50F 1.0*0.5*0.6 - SMD R/TP AMOTECH CO., LTD.	
6	CN401	Connector, I/O	ENRY0010501	GU075-5P-SD-E1500 5P 0.65MM ANGLE RECEPTACLE DIP R/TP - LS Mtron Ltd.	
6	D401, ZD401	Diode, TVS	EDTY0009401	VMNZ6.8CST2R 5.5V 0 10V 0A 200mW SC70 R/TP 6P 5 ROHM.	
6	R410	Resistor, Chip	ERHZ0000203	MCR01MZP5F1002 10KOHM 1% 1/16W 1005 R/TP - ROHM.	
6	C532	Capacitor, TA, Conformal	ECTH0004807	TCM1A106M8R 10F 20% 10V 500mA -55TO+85C 15OHM - - SMD R/TP ROHM.	
6	R421	Resistor, Chip	ERHZ0000295	MCR01MZP5F5102 51KOHM 1% 1/16W 1005 R/TP - ROHM.	
6	VA508, VA509	Varistor	SEVY0003901	EVL5M02200 5.5V 0% 480F 1.0*0.5*0.6 NONE SMD R/TP AMOTECH CO., LTD.	
6	R204	Resistor, Chip	ERHZ0000475	MCR01MZP5J392 3.9KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	D201	Diode, TVS	EDTY0008606	PRSB6.8C 4.7V 5.7 - - 10W - R/TP 2P 1 PROTEK DEVICES INC.	
6	R209, R223	Resistor, Chip	ERHY0000254	MCR01MZP5J472 4.7KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	FL101	Filter, Saw, Dual	EAM62071301	B9836 GSM QUAD 1.8*1.4*0.4 SMD R/TP 10P EPCOS PTE LTD.	
6	C203	Capacitor, Ceramic, Chip	ECCH0005603	GRM188R61A225K 2.2uF 10% 10V X5R -55TO+85C 1608 R/TP - MURATA MANUFACTURING CO., LTD.	
6	Q201	TR, Bipolar	EQBN0020501	KTC4075E NPN 5V 60V 50V 150mA 100NA 700 100mW ESM R/TP 3P KEC CORPORAITION	
6	C103	Capacitor, TA, Conformal	ECTH0001704	F981A226MSA 22F 20% 10V 2.2A -55TO+85C 4OHM 2.2X1.25X1.2MM - SMD R/TP NICHICON CORPORATION, EAST JAPAN SALES OFFICE	
6	CN601	Connector, BtoB	ENBY0036001	GB042-40S-H10-E3000 40P 0.4MM STRAIGHT SOCKET SMD R/TP 1M ENGINEERING PLASTIC UL94V-0 AU OVER NI LS Mtron Ltd.	
6	C112	Capacitor, Ceramic, Chip	ECCH0000701	C1005C0G1H1R2CT000F 1.2pF 0.25PF 50V NP0 - 55TO+125C 1005 R/TP - TDK CORPORATION	
6	C224, C538	Capacitor, Ceramic, Chip	ECCH0000182	GRM155R61A104K 0.1uF 10% 10V X5R -55TO+85C 1005 R/TP - MURATA MANUFACTURING CO., LTD.	

Level	Location No.	Description	PartNumber	Spec	Remark
6	U101	Module, Tx Module	EAT61353301	RF7171 33DBM, 33DBM, 30DBM, 30DBM 0DB 36%, 36%, 32%, 32% 0A 80UA 0DB 0DBM 0DBM 24P 6.63x5.24x1.015MM GPRS QUAD TX DUAL RX MODULE, SP4T, 6.63*5.24*1.015, 24pin RF MICRO DEVICES INC	
6	C222	Capacitor, Ceramic, Chip	ECZH0025502	GRM219R60J226M 0.000022F 20% 6.3V X5R -55TO+85C 2012 R/TP 0.85MM MURATA MANUFACTURING CO., LTD.	
6	C220	Capacitor, Ceramic, Chip	ECZH0001210	C1005Y5V1A474ZT000F 470nF -20TO+80% 10V Y5V -30TO+85C 1005 R/TP - TDK KOREA COOPERATION	
6	FL401	Filter, EMI/Power	SFEY0007101	ICVFP10181E301FR ESD/EMI 0HZ 300pF 0H SMD R/TP INNOCHIPS TECHNOLOGY	
6	X202	Crystal	EXXY0024301	CM315(12.5PF) 32.768KHZ 20PPM 12.5PF 32*15 SMD R/TP CITIZEN DISPLAYS CO., LTD.	
6	U201	IC, Digital Baseband Processor, GSM	EUSY0429401	PMB8815 , 281, EDGE Rx, ARM11 208MHz, NAND booting, 2.0Mp, FMR, IC, Digital Baseband Processor BGA R/TP 281P INFINEON TECHNOLOGIES (ASIA PACIFIC) PTE LTD.	
6	C410	Capacitor, TA, Conformal	ECTH0002703	TCTAL1A107M8R 0.0001F 20% 10V 50UA -55TO+125C 0OHM 3.2x1.6x1.1 NONE SMD R/TP ROHM CO., LTD.	
6	R220	Resistor, Chip	ERHZ0003801	MCR01MZP5J5R1 5.1OHM 5% 1/16W 1005 R/TP - ROHM.	
6	R508	Resistor, Chip	ERHZ0000529	MCR01MZP5J152 1.5KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	VA307	Varistor	SEVY0004001	EVLC18S02003 18V 0% 3F 1.0*0.5*0.6 NONE SMD R/TP AMOTECH CO., LTD.	
6	R222	Resistor, Chip	ERHZ0000531	MCR01MZP5J271 270OHM 5% 1/16W 1005 R/TP - ROHM.	
6	R208	Resistor, Chip	ERHZ0000499	MCR01MZP5J562 5.6KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	FB701	Filter, Bead	SFBH0008101	BLM15AG601SN1D 600 ohm 1.0X0.5X0.5 25% 0.6 ohm 0.3A SMD R/TP 2P 0 MURATA MANUFACTURING CO., LTD.	
6	FL701	Filter, Dielectric	SFDY0003001	DEA202450BT-1275A1 DEA202450BT-1275A1, 2450 MHz, 2.0*1.25*1.05, SMD, 2400M~2500M, IL 1.6, 4pin, U-U, 50-50, BT BPF TDK CORPORATION	
6	CN402	Connector, Terminal Block	EAG62832501	KQ03LV2-3R 3P 3.00MM ANGLE SMD T/REEL - HIROSE KOREA CO., LTD	
6	C520	Capacitor, Ceramic, Chip	ECCH0005604	GRM188R60J106M 10000000 pF, 6.3V, M, X5R, TC, 1608, R/TP, 0.8 mm MURATA MANUFACTURING CO., LTD.	

Level	Location No.	Description	PartNumber	Spec	Remark
6	U701	IC, Bluetooth	EUSY0418701	BCM2070B2KUBXG 2.3VTO5.5V 158.4mW 42P - WLBGA R/TP 42P BROADCOM ASIA DISTRIBUTION PTE LTD	
6	VA501	Varistor	SEVY0010501	IECS0505C040FR 10V 0% 4E-12F 1.0x0.5x0.3 IEC61000-4-1 (ESD) level #4 SMD R/TP INNOCHIPS TECHNOLOGY	
6	C523	Capacitor, Ceramic, Chip	ECCH0000129	MCH155A121JK 120pF 5% 50V NP0 -55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	
6	SW101	Connector, RF	ENWY0008701	MS-156C NONE STRAIGHT SOCKET SMD T/REEL AU 50OHM 400mDB HIROSE KOREA CO., LTD	

13.3 Accessory

Note: This Chapter is used for reference, Part order is ordered by SBOM standard on GCSC

Level	Location No.	Description	PartNumber	Spec	Remark
2	EAY060000	Adapters	EAY62389801	STA-U35ED2 100-240V 4.8V 400mA 50-60Hz CB, CE WALL 2P USB - DONGDO ELECTRONICS CO., LTD	
2	SBPL00	Mobile Phone Battery Li-Ion	SBPL0090501	KU250-553450-LGC-EU KU250-553450-LGC-EU, 3.7 V, 950 mAh, 1 CELL, PRISMATIC , KU250 Europe BATT, IP, Pb-Free LG CHEMICAL	
2	AFN053800	Manual Assembly, Operation	AFN75492001	LGT500.ADEUBK ZZ:Without Color LGT500 manual assy for DEU	
3	MBM087200	Card, Warranty	MCDF0001110	COMPLEX KP202 VDG ZZ:Without Color PRINTING, (empty),	
3	MFL053800	Manual, Operation	MFL67202001	COMPLEX LGT500.ADEUBK ZZ:Without Color LGT500 manual for DEU	